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AT&T suit: Jury mulls MCI award

CHICAGO — A federal jury deliberating on the MCI Communications Corp. vs. AT&T antitrust trial at the time last week began wrestling with complicated technological and financial issues that will have to be resolved in assessing exactly what damages MCI incurred.

An appeals court last year threw out a \$1.8 million judgment against AT&T but upheld the antitrust findings that precipitated the judgment, remanding the case to the lower court for retrial on the damages question.

MCI is now seeking \$5.9 billion in damages from AT&T, an amount that could be trebled under antitrust law for a total of nearly \$18 billion. An AT&T spokesman said the company, which has asked the jury to consider damages in the \$7 million to \$30 million range, would appeal any "large" judgment.

AT&T will shoulder about one-third of any damages, with six of its regional holding companies liable for the remainder.

The case stemmed from MCI's allegation that, before divestiture, AT&T willfully denied MCI the local loop connections that it needed to complete its long-distance calls. Specifically, MCI has charged that the failure to obtain local loops effectively caused it to delay introducing its Executive business offering, resulting in the loss of \$5.8 million in potential profits.

MCI recently settled with one of the seven regional holding companies, U.S. West, and reportedly been seeking similar out-of-court arrangements with the other six. The settlement reached with U.S. West involved both cash and other considerations, including participation in the planning of switch-overs to equal access in U.S. West's exchanges.

IBM net gets nods, yawns

PC Network scores high on speed of installation

By Eric Sander

IBM's PC Network is a solid microcomputer or local-area network offering acceptable performance, reasonable polish and the great advantage of the Big Blue logo, most early users say.

Others, however, show little enthusiasm for the product.

One corporate tester, a senior computer engineer at a Fortune 500 company, said PC Network "is quite easy to install; it took no more than an hour per workstation."

He described the network's overall performance as comparable to mid-range products from other vendors. He also gave good marks to the user interface, "which has a nice set of menus, and you can hot-key in and out." The command language is also well designed, he said.

"I can't believe how good the product is," said Joe King, another early user and president of Legal Systems Software, Inc. in New

See NEWSWIRE page 6

Harris rolls out high-end supermini

By Susan Reinhold

MELOUBOURNE, Fla. — Harris Corp. next week will unwrap the high end to its supermini computer line that appears to be the firm's answer to Digital Equipment Corp.'s VAX 5500 system.

The H1200 is an emitter-coupled logic-based system designed around an 80M byte/sec., 100K-bit ECL bus structure that is said to offer 58% higher system throughput than the previous top-of-the-line H1000, the vendor said.

The system offers up to 256K bytes of bulk cache memory — in 96K-byte increments — with 105-nsec cycle time in addition to the standard 48K-byte primary cache with 75-nsec cycle time.

Three types of Harris' integrated memory subsystems can be intermixed in a single system to provide up to 12M bytes of main memory. Parity error checking on a word-boundary basis is available on the Static-RAS, the

See HARRIS page 6

TRENDS & DIRECTIONS

SNA upgrade: The ultimate link?

By John Gallant
CIV star

The ability to link diverse applications running on anything from a personal computer to a top-of-the-line mainframe is a high-tech Holy Grail that has eluded the grasp of most users.

But a strategic IBM enhancement to its Systems Network Architecture may hold the key to that kind of processor-independent, application-to-application communication. When fully implemented, analysts and IBM said, the 1983 SNA protocol-subset Logical Unit Type 6.5 or Advanced Program-to-Program Communication —

will transcend the traditional SNA master/slave relationship between linked devices and allow mainframes, minicomputers, micros and other processors to communicate on a peer-to-peer basis through software.

LU6.2 has been touted as IBM's answer to intelligent micro-mainframe linkage. But there is growing recognition that the SNA enhancement will have significance far beyond that realm and may even usher in the era of distributed processing.

The micro-mainframe link aspect is just a subset of the overall importance of LU6.2," said Thomas O'Flaherty, a principal

See PROTOCOL page 8

TOP OF THE NEWS

Come out with your tapes up. Armed with a warrant, the agents raided offices of alleged trade secrets pirates, seizing software and documents as evidence. Page 2.

Is cheaper better? AT&T's cabling scheme can cost half that of IBM's, but this might not sell users. Page 4.

Prime attractions was Unix. A beta user of Prime's Unix implementation likes Prime's versatility. Page 8.

Natural fit. Software AG announced a version of its micro-mainframe link that is compatible with Ashton-Tate's dBase III and Framework. Page 11.

Metropolitan Life is supporting AI programming in its underwriting and risk assessment functions. Page 12.

Two amateur computer scientists have built a 16-node, 256-MHz parallel processor they claim cost them less than \$100,000. Page 71.



VITACOM

Computer-aided design and manufacturing came to the July 800 yesterday as part of the Pentax rising heart's 200+ mph drive for the checkered flag. Story page 14.

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NEWS

Software seized in trade secrets case

Employee tip prompts police raid on Texas firm's offices

By John Deane
On line

DALLAS — Texas state investigators have seized software and documents from the offices of Voice Control Systems, Inc. here as part of an investigation into the possible theft of speech recognition trade secrets from Texas Instruments, Inc.

State investigators and TI employees raided Voice Control's offices and seized 107 items, including the software, according to Richard Zedina, chief of the Dallas County district attorney's specialized crime division.

Based on information from a Voice Control employee, the district attorney's office obtained a search warrant that specified "all digital storage media... including magnetic tapes, removable disks and fixed disks" could be seized as evidence, Zedina said.

TI last week filed a civil suit against Voice Control alleging that two former TI employees stole company trade secrets on speech recognition and speech processing technology. In response to the TI suit, a Texas judge issued a temporary restraining

order barring Voice Control and former TI employees Robert G. Leonard and Thomas R. Schalk from continuing to use the alleged secrets.

The judge also ordered Voice Control not to dispose of any allegedly stolen secrets and any profits realized from selling them and scheduled a May 29 hearing on TI's request for a temporary injunction.

Seizure evidence

Zedina said that while the seizure of software as evidence was unusual, he believes "any item of evidence that has relevance to the issues at hand will be admissible. You can't go to work for a company like TI, get access to proprietary information, dump it all on a computer tape and then leave. We have laws against that in Texas."

Texas law categorizes theft of trade secrets as a third-degree felony, punishable by two to 10 years in state prison and fines up to \$5,000. Zedina said Texas law does not specifically mention software but does say the theft of any "article representing a trade secret or communicating a trade secret... including any object, material and device" is illegal.

Zedina said he would rely on outside experts to determine if the software and seized documents contain sufficient evidence to present to a grand jury.

Apple to close disk plant; lays off 80

By Kathleen Sullivan
On West Coast Bureau

BAIN JORD, Calif. — Apple Computer, Inc. last week announced plans to close its hard disk drive manufacturing plant here. As a result, 80 workers were laid off.

Most of the employees produced disk drives for the Lisa computer, a system that Apple dropped from its product line last year. The facility here was also the center of research activity for two Apple Macintosh Office projects — a 20M-byte hard disk drive and a file server.

What has not been officially announced is that the decline for shipping the file server, a key ele-

ment of Apple's office systems product line, has been pushed back several months to the end of this year.

Instead of developing those products itself, Apple is relying on outside vendors, said spokeswoman Barbara Krause. Although she declined to identify the companies involved, Krause said contract negotiations are already under way.

A small group of engineers were transferred from the plant here to the Macintosh division, where they will continue research on hard disk drives, Krause said.

She declined to comment on whether Apple plans additional layoffs.

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Software AG and Ashton-Tate will jointly develop and market software that ties together Software AG's micro-mainframe Isis and Ashton-Tate's data base management and multifunction productivity programs/10

Cobol programmers often resist learning the tricks needed to program effectively in Software AG's Natural, according to users at the recent Software AG users conference/11

Metropolitan Life Insurance Co. has built knowledge-based systems to help develop and understand underwriting and risk assessment functions/13

Drivers on the Penske automobile racing team courted on computer-aided design technology for the race's edge in yesterday's Indianapolis 500/14

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A variety of problems have been plaguing the payroll system at the Internal Revenue Service's Detroit Data Center/22

A Los Angeles man has pleaded guilty to gaining unauthorized access to U.S. government computers in Colorado/26

Paris recently hosted the Special Scoob '85 and Talking Machines '85 expositions/27

France has made a national commitment to provide available computer technology to day-to-day life and to help citizens access that technology/28

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Random access

IBM will unveil its first token-ring, local-area network products by late summer or mid-fall, according to numerous sources. To that end, Texas Instruments is reportedly conducting trial production runs of very large-scale integration token-ring interface chips. TI development work is being spurred, sources said, by the fact that, after having contracted with TI for these interfaces in 1982, IBM has given similar responsibilities to chip maker Intel, which IBM partially owns.

The popular Pecos fourth-generation language will become available for the first time in the minicomputer environment via Information Builders' univac DEC VAX/VMS version of the language at the Dexco conference in New Orleans on Tuesday. Pecos is currently available for IBM mainframes and Personal Computers.

SAB Institute in Cary, N.C., has indicated that it intends to rewrite its entire line of mainframe and minicomputer software in the C language. SAB products include a basic statistical system and graphics and other applications packages. The company's recently released microcomputer software was developed in C, and the decision to rewrite the large systems software was made, officials said, to improve the maintainability and portability of the packages. The revision process is under way and is expected to continue throughout this year and next.

Kurweil Applied Intelligence of Waltham, Mass., will unveil a 1,000-word speech recognition system for the IBM Personal Computer line, according to a company source. The self-contained unit, KVS-505, will translate user-defined words into Ascii character strings. The Ascii characters can then be transmitted through an RS-232 port to a microcomputer and will be accepted as though they were keyboard entries. The speech recognition package will be available in September for \$6,500.

In June, Intel's Integrated Systems Operation, based in Phoenix, will announce Opennet Express, a networking package that will offer one-stop shopping to corporate systems integrators, according to an Intel marketing manager. Opennet Express will include Intel's 80286-based 810 microcomputer running Xenix or RMK (the firm's real-time operating system); Xenix or RMK networking software; an Opennet (Ethernet) controller board; an Ungermann-Bass network controller board; and Microsoft's MS-Net. The package, which will also include installation, orientation and service from Intel, will be priced under \$30,000, the source said.

Look for a June 3 announcement of an eight- to 16-user Intel 80286-based supermicro from Altos, according to a senior marketing official at Altos.

IBM, a software and services company specializing in products for users of Cullinet Software's IDMS, will introduce an IDMS-like data base system for the IBM Personal Computer, Personal Computer XT, AT and compatibles running PC-DOS or Microsoft's MS-DOS, a spokesman said. The Developer Workstation will be compatible with IDMS and can support development and operation of batch and on-line applications on the mainframe. The product will cost \$4,595. During the year, DBMS will also announce versions of its Developer Tool Kit and Release 5.0 of its DBA Tool Kit for IDMS users.

SUSPENSE

**How did IBM's
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do in its first
meeting with
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scouting report.**

It is one of those historic moments in the Annals of Sort! The very first appearance in competition of IBM's new DFSORT, Release 7, in the tough-as-nails MVS/XA League. Will the kid be able to live up to his advance press notices?

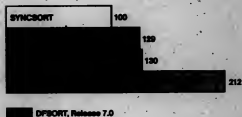
Confidently DFSORT7 strides to the plate... knocks the dirt out of his spikes... hitches up his britches... raises his sort assists.

Then, as sorting fans everywhere gasp in amazement, he lifts his arm lazily and points toward the centerfield flagpole, thousands of bytes away. The kid is going to try to emulate Babe's mighty homerun shot!

Moments later, SyncSort winds up... a curving white blur is seen... and... and...

There is no joy in Armonk! DFSORT7 struck out every time it came to bat against the latest release of SyncSort (Release 2.5E) in a recent series of MVS benchmark tests. (In sorting, as in most other forms of human endeavor, it's a long way from baby to Babe.)

The bar charts below tell the story more eloquently than we can:



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NEWS

AT&T's cabling costs half of IBM's, but a hard sell

By John Rie
CI Staff

AT&T's answer to IBM's Cabling System can cost half as much as the mainframe maker's building wire scheme, but cost alone may not sell users.

Earlier this month at the International Communications Conference in Dallas, AT&T Information Systems formally introduced its Premises Distribution System (PDS). Like IBM's Cabling System, PDS specifies the type of wire used to cable a building to provide voice and data outlets in all offices.

Both systems are styled after traditional telephone wiring schemes and, as such, are designed to make installing and moving computer peripheral equipment as easy as rearranging telephones.

The schemes are similar in that both divide a building into horizontal and vertical cable runs. Cable that contains separate wire for voice and data is run in a star configuration from central wire closets on each building floor to every office on that floor. These closets are then wired together and to equipment rooms through vertical risers.

The key difference between the two systems is the type of cable used. The primary type of cable specified in IBM's Cabling System contains four voice-grade, twisted-pair wires and two independently shielded data-grade, twisted-pair wires. AT&T's PDS cable contains four twisted-pair wires, but it must be supplemented with fiber-optic cables in the risers to offer data support similar to IBM's system.

Differences in cable contribute to the disparity in price. "There is a significant price difference between systems," according to Dixon Doll, chairman of DMW Group, Inc., a consultancy in Ann Arbor, Mich. "In most situations, AT&T's PDS is going to cost 50% less than a comparable Cabling System configuration."

The largest difference in price would be realized where existing telephone wiring can be used with AT&T's PDS, added Harvey Freeman, vice president of engineering with Architecture Technology Corp., a consulting and publishing company in Minneapolis that specializes in communications.

But are all twisted-pair wire will fit the bill. According to Fred Weber, technical supervisor of PDS systems engineering for AT&T, the system requires high-quality wire. A user's existing facility would have to be exam-

ined to see if it could be used. AT&T is, however, one of the few private branch exchange (PBX) manufacturers that install four-pair wire with new switches.

The cost of the actual cable is "noise compared [with] the total cost of putting in a wiring system," according to Brian Jeffery, director of research for International Technology Group, Inc., a research and consulting firm in Palo Alto, Calif. In that regard, the decision to go with one system rather than the other will depend on the "customers' requirements and their environments," Doll said.

"I was a deeply loyal IBM customer with a brand new building and I was going to put in a PBX [from IBM subsidiary, Bolt Corp.] and was not concerned about squeezing every last dollar out of the cost. I would probably lean in favor of IBM," Doll said. "If, on the other hand, I was going to be using an AT&T PBX and I was a little more cost conscious, then I might look at AT&T's PDS."

One unknown is where and how the IBM token-ring network will be supported.

Today, the Cabling System is sold on the basis that "it's cheaper and easier than using the IBM 3270 point-to-point [cable] system," Jeffery noted. AT&T can also sell into IBM environments making that same claim. But IBM has promised that its forthcoming token-ring local network will be built on top of the Cabling System, a promise that will hold sway with the large base of IBM users.

Consultants agree that AT&T will probably do what is needed to make PDS compatible with IBM's promised network. AT&T's Weber said, "We'll take a very hard look at what type of capability we need to install in PDS to be able to support the token ring."

Regardless of compatibility and cost, some users will stick with IBM to support IBM equipment. "I know of a couple of major IBM accounts that said they would put the Cabling System in no matter what happens," Doll said. "If you're a big IBM customer worrying about long-term strategy for network management, you would probably feel more comfortable doing problem resolution and troubleshooting knowing you have a Cabling System."

Asked which system he would recommend to clients, Architecture Technology's Freeman said, "Maybe the AT&T system. The price of the IBM Cabling System is too high right now for that particular cable."



DPMA, ACM to cosponsor meet

CHICAGO — The Data Processing Management Association (DPMA) and the Association for Computing Machinery (ACM) are cosponsoring an international conference titled "Management and Information Technologies" at the Expo Center here from April 2-4.

The conference will focus on methods of bridging the gap between management and technology. Issues to be addressed include managing technology, the technology of management, technology transfer and managing the technologist.

The conference chairman is Gordon B. Davis, a Honeywell [Inc.] pro-

fessor of management information systems at the School of Management, University of Minnesota. The program chairman is Martin L. Baruffi, associate professor of information resources management at the Stuart School of Business, Illinois Institute of Technology, Chicago.

The conference registration fee is \$110 for DPMA or ACM members; the fee for nonmembers is \$130.

Information is available from either Doris Dodge, Conference Manager, DPMA, 606 Busse Highway, Park Ridge, Ill. 60066; or Roberta Baker, Conference Coordinator, ACM, 11 West 42nd St., New York, N.Y. 10036.

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Beta user gives thumbs up to Prime's version of Unix



By John Deane
Ch. 30

FOXBORO, Mass. — A beta user of Prime Computer, Inc.'s Primix was attracted to the operating system out of a need to accommodate AT&T Unix users.

Primix is Prime's implementation of AT&T's Unix System V that runs cohesively with Prime's Prime operating system [CW, May 20].

At Foxboro Co. here, a manufacturer of industrial control systems, Unix users had been using a PDP-11/750, but that machine was recently redesigned to run a computer-aided design and manufacturing application under DEC's VMS. The company's Unix users, who do general problem solving in scientific and engineering applications, had no place to go once they lost their VAX, according to William Kapham, manager of technical systems software and operations at Foxboro.

A Prime user since 1978, Foxboro now has a Prime 780 mini that accommodates 85 to 40 users at a time. The firm also has six DEC VAX machines for scientific and engineering applications and an IBM 4381 mainframe for commercial applications.

The versatility we need

Kapham, who is responsible for running Foxboro's technology division computer systems, said the versatility feature of Primix "gives us the versatility we need." By agreeing to begin testing Primix in mid-April, Kapham was able to bring his Prime users up on Unix more quickly and with full support from the vendor. He said a close relationship grew between Foxboro and Prime during testing. "When there was a problem, they were right on it," he said.

Because the firm's Unix users had been working with the University of California at Berkeley Version 4.1, bringing them up on Primix was not difficult, Kapham said. "Some commands are different from Berkeley 4.1, but they're close enough so users didn't have too much trouble switching over. They just logged on and started doing their thing," he said.

Documentation was good and not as obscure as the Berkeley documentation, he said. "With Berkeley, you're constantly flipping forward and back trying to find a specific thing. Prime has written it so you can understand it," he said.

Security is maintained by allowing users to log on only to Primix, which Kapham said the company has made secure. To switch from Primix to Primix, users just type in "Primix" and then push the Execute key without having to log off and log on again. File transfer from the Prime to the IBM system is done with an RJE link via IBM's Asap. Kapham has not done a file transfer using Primix yet but said he expects no problems.

The layering of Primix onto Primix did cause a 10% slowdown in response time on Foxboro's system. "But I have a very heavily loaded system," Kapham said. "If I had logged five more users [onto Primix],

I probably would have had the same slowdown." One morning Kapham had a 3-second response time with 31 users on his Prime system. With 66 or 67 users, response time is usually 4 seconds, he said. By year's end, he hopes to improve response time by buying a Prime 9060, the vendor's biggest machine.

The co-residency of Primix and Primix "gives me the best of both worlds," Kapham said. The fact that he cannot run Primix in native mode as DEC users can do with Unix is, he noted, "I don't believe there is a best way for all users. In some applications, you'll want to run just one operating system. For a general-purpose, prob-

lem-solving machine, it's great having both of these machines. There are things you can do in Primix you can't do any other way. And there are things you can do in Unix you can't do in other ways."

The performance of Primix has convinced Kapham to buy the operating system once the testing period is over. He said the price of \$15,000 for a 32-user version is reasonable. A major advantage of getting a Unix implementation from Prime over using Berkeley 4.1 is support, he said. Berkeley charges only a nominal price for the media and the cost to produce it, but it offers no support for its version.

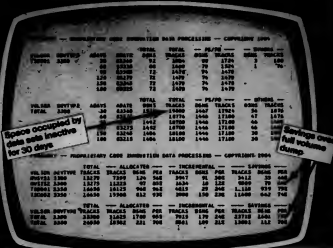
"You get what you pay for," Ka-

pham said. "I have a systems programmer who is well skilled in Unix, but there are intricacies of the operating system that he might not be expected to know. With Prime being the supplier, we can get the vendor right here. I'm looking forward to that."

From his experience with Primix, Kapham would cite no weaknesses of the product. He noted that Prime has tried Unix implementations before, and Foxboro had even tested one. "It was very crude at that point in time," he said, and no product came in fraction from the test.

Kapham praised Prime's service and support. "They're the Maytag requirement; we don't see them that often," he said.

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NEWS

HARRIS

from page 1

fastest of the IMS memories, consisting of 1Mx8-byte static random-access memory (RAM) Nmos chips. Up to 3M bytes of Static-IMS can be included in the H1200 memory.

The ECL-IMS uses 56Kx8-byte dynamic RAM chips, and up to 12M bytes of this memory can be configured on the H1200. IMS-II — also available on all other Harris H series computer systems — is the third type of main memory available on the H1200. This subsystem, which also uses 256Kx8-byte dynamic RAM chips, has 528-nsec cycle time and is resident on the 18M-byte I/O bus.

The Model H1200-1 includes 1.5M bytes of ECL-IMS main memory that resides on the 80M byte/sec. ECL bus and features 370-nsec cycle time. It also has a standard 96K-byte bulk

cache memory. According to the vendor, the basic cost for this machine is \$294,000.

The H1200-5 includes a 1.5M-byte Static-IMS memory and is said to be fit for real-time environments where time constraints are critical. Prices start at \$325,000 for this model.

The Communications Network Processor (CNP) is said optionally to support asynchronous, synchronous, isochronous, X.25, IEEE 488 and Ethernet protocols simultaneously, with boards for these protocols ranging in price from \$500 for asynchronous to \$2,500 for IEEE 488. The basic systems include a CNP with one pair of asynchronous boards, the vendor said.

More information is available from Harris, Computer Systems Division, 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.



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System	Model 65	Model 650	Model 750	Model 650	Model 1200	Model 1200
Model	75	75	25	1-1-1-8	4-8	8
Purchase Price* (Minimum Price)	\$68,500* (7800)	\$38,500 (7800)	\$48,500 (3800)	\$138,000 (1800)	\$250,000 (1,250)	\$294,000 (1,250)
Baseline Cycle Time (nsec)	300	300	300	180	75	75
Cable (Buffer) Size	64*	64*	64*	64*	64	256*
Price per 128 byte of main memory*	\$16,000	\$10,000	\$10,000	\$10,000	\$10,000	\$8,000

REVIEWS from page 1

York, which has installed the network both internally and at customer sites. "I had it working in one day." In a three-station network with an IBM Personal Computer AT acting as a server, accessing network storage appeared as quick as accessing a local Personal Computer XT drive, King said.

As another user, a systems analyst with a Big Right accounting firm, said that PC Network "does the job, but I don't think much of it. It's definitely not as good as those networks offered by [ComCorp or Novell, Inc.]. Performance degrades very quickly as users are added, limiting the network to small work groups, the analyst maintained.

As another limitation, PC Network's method of naming network drives raises problems with current applications packages, he said.

Setting up a multiple-server configuration also is difficult, he remarked. When booted, the two servers are likely to "sit and poll each other and beep their error messages — it almost sounds like a Pong [video game]."

Further issues arise in error-handling, the analyst commented. "There are 850 error messages that can be received, which really makes you worry, and a lot of them can't be resolved until you're out of the application." This nets up situations in which work can be lost without the user being aware of it, he claimed.

Other users pointed out that applications tailored specifically for the IBM network, which are just beginning to appear, will address many of these concerns.

While views differed on the ease of installing the net's fixed-length broadband cable, there was a consensus that the installation software program was easy to follow.

However, all of the users contacted by Computerworld had modified IBM's suggested installation procedure

at least slightly. The way sub-directories were set up on the network disk, for example, did not work with some programs, such as Micropro International Corp.'s Wordstar, King said.

While King had no difficulties solving that problem, several other users complained that the setup procedure lacked sufficient flexibility and documentation.

Pricing for PC Network appeared moderate, users said. Electronic Mail headed their list of suggested network enhancements.

Users noted that the PC Network does not support all IBM microcomputer products, with one person voicing

a wish to hook up the Personal Computer AT/370. Problems also may arise with IBM-compatible systems. In the case of Compaq Computer Corp., systems shipped before May must be refitted with a real-only mem-

ory BIOS to work on the PC Network, a Compaq official acknowledged.

While many continue to question whether IBM's upcoming token-ring network will supersede the PC Network, one common industry opinion was summed up by Henry Seelinder, director of communications and networking at Morris Decision Systems, Inc. in New York.

"The basic functionality is there," Seelinder said. "A lot of people will buy it because it's a reasonable product and it's by IBM."

Customer-installable versions of the PC Network, a broadband carrier-wave multiple access with collision detection network operating at 2M bps/sec, can support up to 72 users. A network adapter card costs \$695, a network translator unit is priced at \$695 and the network operating system sells for \$75.

IBM announced the PC Network last August and shipped the hardware in October. Deliveries of the network software began in March, with a 3270 gateway software package available in April for \$375, according to IBM.

99
All of the users contacted had modified IBM's suggested installation procedures at least slightly.

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How To Delight Your Lotus With Mainframe Data



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IBM open with LU6.2 specs

The consensus among software developers and analysts is that IBM has been open about providing the technical specifications for Logical Unit Type 6.2 (LU6.2) and has made it clear that LU6.2 compatibility is a strategic direction for Big Blue.

"IBM has been very good about releasing LU6.2 specifications," said John Duberty, vice-president of marketing and sales for Malvern, Pa.-based Rabbit Software Corp., a vendor of Systems Network Architecture software. "It just has not made public the full plan of how it intends to implement LU6.2 across its products. IBM has said it is going to make a heavy commitment to LU6.2, and if you want to participate in this market, you [had] better listen."

So give your PC a TURBO from AVATAR. And delight your Lotus with mainframe data.

protect its technological edge, noted John King, executive director of San Jose, Calif.-based James Martin Associates. "IBM wants LU6.2 to be an industry standard, so it publishes enough to get others started," he said. "But IBM publishes information based on a schedule [that is] based on the release of its own products."

Even though IBM has made public much of the information regarding LU6.2, adapting to the changing environment it is likely to bring about will not be easy for independent software vendors.

"LU6.2 is going to make for a challenging period ahead," said Thomas O'Flaherty, a principal with the Wood-Ridge, N.J.-based consulting firm Information Service Strategies. "The mainframe ecosystem will have to work very hard to keep up."

—John Ballant

PROTOCOL

pal with the Wood-Ridge, N.J.-based consulting firm of Information Service Strategies. "With LU6.2, any two programs on any two machines can be linked together. It is probably one of the biggest opportunities to come around in years."

According to an IBM spokesman, LU6.2 "is, within SNA, a type of session between two application programs in a distributed processing environment using an SNA character string or a structured field data string." What that means is that LU6.2 is a standard set of definitions or rules for data sharing between applications running in a communications network. Fully implemented, it lets two on each program, regardless of its host, an equal status for sending or requesting data.

"What we tried to achieve was to allow programs to communicate on a peer-to-peer basis," said Dr. Robert Sundstrom, manager of communications systems architecture within IBM's SNA Group in Raleigh, Va. "The form of communications are not addressing in LU6.2 is program-to-program rather than just program-to-device. We think LU6.2 will become very pervasive over time, and we think it will be widely implemented outside IBM."

"LU6.2 definitely has the potential to revolutionize micro-mainframe communications," he added.

John King, executive director of James Martin Associates in Carmel, Calif., explained how LU6.2 facilitates peer-to-peer communications: "A micro package supporting LU6.2 will be able to communicate on a peer basis with another application that supports the same protocol on another machine. It can do that without worrying whether the other machine is a mainframe, a departmental machine or a micro."

"In the past, the only way to facilitate such data transfer was to have a program in the mainframe supervising it because all the machines below it in the IBM architecture were secondary," King noted.

With LU6.2, you will not have to have a mainframe constantly polling all these devices to see if they have a request to send or receive data.

That will represent a dramatic improvement over current micro-mainframe links, many of which are based on terminal emulation—the transformation of an intelligent micro into what appears to be a dumb terminal. According to John Duberty, vice-president of marketing and sales for Rabbit Software Corp., an SNA software vendor in Malvern, Pa., "LU6.2 will take the handcuffs of having to look like another machine off the micro. It will allow you to run an application locally on the micro and use the massive data base of the mainframe as if the mainframe was a peripheral."

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JOHN CULLINANE

On the Information Center Strategy

Today, virtually every IBM mainframe user is attempting to implement an information center. Formulating a successful information system strategy for the 80's and 90's requires it.

However, one of the major problems many companies face is the variety of software and databases located on different mainframes, departmental minis and personal computers. The challenge is to create an environment that integrates this diversity, is

"Open system architecture is key in implementing an information center strategy"

responsive to the corporate user community in meeting its information needs and, most importantly, provides access that is consistent and transparent. This is why open system architecture is key in implementing an information center strategy.

It also makes particular sense for a software company like Cullinet to adopt a policy of open system architecture that allows corporations to standardize on Cullinet's products without losing a significant investment in other vendors' products—whether they are mainframe applications, microcomputer software such as Lotus 1-2-3, Symphony and other PC products or departmental minis from companies like Digital, Data



General, Wang, Hewlett-Packard and others.

That's why Cullinet has introduced the Information Center Management System. It's one part of a strategy that makes it much easier for the VP of Information Systems to standardize on the full range of Cullinet software, including our proven mainframe data-

base and applications and our integrated GOLDENGATE microcomputer software.

Our strategy makes sense not only because Cullinet products are designed to work together, now and in the future, but also

because our open system architecture means that data processing management will be able to accommodate satisfied users of other software while anticipating the introduction of new products.

For more information about the Information Center Management System and the full range of Cullinet products, I encourage you to phone, toll-free, 1-800-225-9930. In Massachusetts, the number is 617-329-7700.

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Software AG announces Dbase III-compatible link

By John Donahue
CIS Staff

NASHVILLE — Software AG has announced a new version of its Natural/Connection micro-mainframe link compatible with Ashton-Tate's Dbase III data base management system (DBMS) and Framework multifunction productivity programs.

The two firms also announced their intention to jointly develop and market software, joining a growing list of systems software houses and micro software vendors that have reached agreements in order to exploit the end-user computing market.

The announcements came at Software Junction, the 14th International Software AG Users' Conference,

attended by approximately 1,200 users at the Opryland Hotel here last week.

Version 2 of Natural/Connection runs on the IBM Personal Computer family and is scheduled for August availability.

Sam Posner, executive vice-president of Ashton-Tate, said at the announcement, "We can't continue to package in the micro world which has little space on retail shelves."

Stuart Miller, president and chief executive officer of Software AG, said, "We want to drive closer to packages in the micro world which have high marks."

The linking of Software AG's Natural/Connection to the Ashton-Tate

software is said to allow use of data in micro or mainframe applications without an intermediate data base.

Security option

Security features of Version 2 include an option to encrypt mainframe data stored on the micro and a personal computer audit trail of every instance of data downloading and uploading.

Version 2 has a function that automatically formats downloaded data for use with Framework and Dbase III. Data can be manipulated or entered on the micro and formatted for uploading to the host. The uploaded data can be used to update or add to the mainframe data base, under the

control of Natural/Connection and Ashton-Tate. Address is Software AG, Appleton, WI 53411.

Dbase reportedly is able to move transparently between the micro and mainframe environments.

Version 2 also allows to download mainframe data from mainframe, and it allows users to customize the means and applications to be involved. Version 2 users also can respond and reactivate local applications and involve community used IBM PC-DOS functions and utilities from Natural/Connection.

Version 2 also allows certain tasks to be scheduled for processing automatically during off-peak times, and a documented applications interface allows users to develop local software to drive Natural/Connection functions. The translation of binary and object data is supported by Version 2, in addition to Ascl and Eclitic numeric and character data.

Version 2 is supported on the IBM Personal Computer XT, AT, AT, 3270 Personal Computer and any microcomputer operationally compatible with the IBM Personal Computer, the vendor said. The product is supported by PC-DOS and Microsoft Corp.'s MS-DOS environments and requires the Software AG mainframe software programs Natural and Address or Natural/Team for all operating systems that support Natural.

Asynchronous communications support for Version 2 requires the installation of an asynchronous communications hardware board, available from IBM, on the Personal Computer. Speeds of up to 9.6K bit/sec. are supported.

Communication over a dial-up telephone line requires a modem or a Personal Computer hardware board that combines an asynchronous communications port and a modem. Synchronous communications support via coaxial cable requires an installation of Digital Communications Associates, Inc.'s Ima board or another 3270/9 emulator board into the Personal Computer.

Natural/Connection Version 2, as an extension to Address and Natural, costs \$15,000 to \$25,000 for the mainframe software and \$250 to \$1,000 per Personal Computer diskette.

Software AG is located at 11800 Sunrise Valley Drive, Boston, VA 22061.

Kodak announces plain-paper printing: the lowest-cost retrieval you can buy.

Presenting the Kodak IMT-350 microimage terminal and the Kodak Starvue II reader-printer, the first image-management work stations from Kodak with the plus of plain-paper printing. And unmatched retrieval savings.

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New KODAK STARVUE II
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New KODAK IMT-350
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with Plain Paper Printing

Consultant directory out

WOODBRIDGE, Conn. — The third edition of a directory with more than 2,600 listings of reference-qualified professional computer consultants and consulting companies has been published by Research Publications.

"The Directory of Consultants in Computer Systems" has an index organized by expertise to help readers find consultants who have the hardware and software expertise they are looking for.

The directory is available for \$75 from Research Publications, 13 Lunar Drive, Drawer AB, Woodbridge, Conn. 06535.

Die-hard Cobol programmers try Natural and like it

By John Deamond
CWI

NASHVILLE — Users of Software AG's Natural fourth-generation language are teaching old programming dogs new tricks.

Experienced Cobol programmers usually resist programming in Natural because many believe they are risking their marketability, but the programmers are usually happy using Natural once they convert, said several users interviewed at the Software AG users conference here last week.

Patricia Swingle, data base administrator at Commercial Union Insurance Co. of Boston, said, "Most of our Cobol programmers resisted using Natural, were forced to use it and ended up liking it." To meet its expanding applications development needs, Commercial Union now hires programmer trainees, some with only six-month programming courses as background, to program applications in Natural. "They're immediately productive, they're cheaper, they're easier to get, and they don't have the Cobol mental framework," she said. The trainees are usually paid \$15,000 a year to start vs. the \$36,000 yearly salary an experienced programmer would earn, she said.

Different programming skills are needed to use Natural effectively, she said. For Cobol programmers, "It's tough to design programs in Natural because you're always got to think about what Adabas can do for you," she said. (Adabas is Software AG's relational data base management system.) At Commercial Union, which runs five Digital Equipment Corp. VAX superminis and IBM 4381, 3088 and 3081 mainframes, parts of some programs are still written in Cobol, but 90% of new applications are written in Natural, Swingle said.

The challenge of converting Cobol programs to Natural is being met halfway around the world from Commercial Union at Shell South Africa Ltd.

In Cape Town, Peter Pusey, data manager at the site, said, "A Cobol programmer who writes in Natural will usually not get the benefit" of all its fourth-generation capabilities. To monitor applications written by the Cobol users at Shell South Africa, the applications are reviewed by a quality assurance person trained in Natural constructs. Some programs that were written badly in Natural were revised by experienced Cobol programmers to yield 10 times better efficiency, Pusey said.

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'Most of our Cobol programmers resisted using Natural, were forced to use it and ended up liking it.'

— Patricia Swingle
Commercial Union Insurance Co.

Still, in Pusey's view, the advantage of Natural is not that it works better than Cobol but that applications take less time to develop and data is more flexible. "As we increase our [million instruction/sec. processing power], then I'll be more likely to say that Cobol is dead," Pusey said. His shop now runs an Amdehl Corp. V8 and an IBM 4381. Cobol programmers are trained to use Natural at Shell South Africa, Pusey said. "Cobol programmers will always grab the Natural manual, go off and say, 'I can do this.' After a one-week course in Natural they say, 'Well, I consider I have done that,'" Pusey said. "Most Cobol programmers don't want to be Natural programmers. They're worried about their marketability. But that's not killing Natural."

Like Swingle, Pusey said his Cobol programmers complained before beginning to use Natural, "but once they use it, they don't want to change."

Jeff Moemann, a senior systems engineer with Perotet of Johannesburg, South Africa, said, "People are scared of moving away from their Cobol programs." He said the number of Cobol/Vms installations in the U.S. not yet using data base languages management ultracore systems. Fourth-generation languages like Natural have a higher penetration in South Africa, he said, because that country's programmer manpower shortage makes programmer productivity more critical.

Another user, from a U.S. grocery wholesaler, who did not wish to be identified, said his attempts to persuade his company to acquire Natural have so far been unsuccessful because "management perceives that Cobol programmers would lose position in the job market by going to Natural and not using their Cobol skills" and would leave as a result. He said he has argued that the savings in programmer productivity would make up for any loss. He noted the company has a four- to six-year applications backlog.

Another U.S. insurance company is using a mixture of Natural and Cobol in writing applications. Patty Prime, design and programming supervisor with American Family Insurance in Madison, Wis., said the company has used Natural for three years, but some applications are still written in Cobol. "Anything that has a common subroutine is easier to do in Cobol because you can call it more easily," she said. But some 80% of new applications are written in Natural, she said.

Prime said her company, which runs two Amdehl 5870s, brought up an internal payroll savings plan in six months using Natural, faster than it could have been designed, coded and tested using Cobol, she said.

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OAC '86 meet slated for March

ROUSTON — The OAC '86 conference for business automation and telecommunications will be held at the Astorhall here March 24-26. The conference and exhibitions are sponsored by the American Federation of Information Processing Societies, Inc. (AFIPS).

Next year's conference theme is "Integrated Systems: Merging Islands of Technology," and the chairmen will be William J. Carlisle, assistant vice-president of Bell Communications Research Corp., and Michael R.

Aloup of Arthur Andersen & Co.

The conference fees are as follows: paid in advance for the whole conference, \$100 for AFIPS constituent society members, \$125 for nonmembers; paid in advance for one day, \$40 for members, \$50 for nonmembers, \$25 for students; paid on-site for one day, \$50, and for full conference, \$150, for anybody. The professional development seminars fees are \$95 for a full day and \$45 for half day. Exhibits-only prices have not yet been set, a spokeswoman said.

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NEWS

Insurer supporting commercially viable AI programming

By Susan Belmont
CI Staff

NEW YORK — The senior management of the second largest insurance company in the U.S. is supporting commercially relevant artificial intelligence programming research and development here.

"Our definition of 'reality for the commercial world' is

that we figure out a way to make more money to return to our policyholders," said Roger Jones, planning manager in charge of implementing the expert systems at Metropolitan Life Insurance Co.

The number of rules in a knowledge-based system is a basic measurement of the program size, he said, and

250 to 400 rules are enough to screen initially the underwriting of an insurance policy. There are no indications that his programs are damaging the response time of the 300 to 400 other users on the hardware system, Jones said.

The AI project began when the company's chief management office — made up of President and Chief Execu-

tive Officer John J. Creighton and the company's executive vice-presidents — outlined strategic goals for five- and 10-year periods. One of the results was a decision to address how technology could be used as a resource to fulfill strategies, Jones said.

Metropolitan Life tried expert systems for applications such as underwriting screen-

ing, medical presentation review (for doctors to find out if a particular illness was caused by an individual's policy), dividend calculation for group insurance and risk assessment, Jones said. Jones' mandate was to get a crystal ball on the technology so that he could make recommendations for AI efforts in the rest of the company, he said.

"We were trying to get a feel for how big the programs were, how difficult they were to code, how difficult they were to debug and how easy it was to modify them if the rule changed," Jones said.

Results of 10,000 cases

One underwriting project involved looking at the results of 10,000 cases to determine whether obtaining an additional document to support the underwriting process would be useful and how often it would be useful; the group also looked at the case results to rewrite the rule about obtaining the additional document to reflect the current reality of how useful it was, Jones said.

That project turned out to be "incredibly difficult," he said, because of all the specific selection criteria, such as which rules to target, how the system was going to learn about the rule and how to create the new rule.

The development team decided that studying one million cases using standard, retrospective statistical methods would work better at that stage of the game, he said.

A risk assessment system that Jones is developing with risk assessment experts will become a production system if the risk assessment people reach a point where they can incorporate enough expertise in the knowledge system to make it financially feasible to run, Jones said. It will probably take a year with two to three people working on the system to complete it, he said.

Completion is a difficult stain for an expert system, Jones said. An expert provides the system designer with his knowledge on a subject for a knowledge base. Many times, however, the expert does not feel comfortable with that knowledge, saying he was never happy with a particular way he did something or with the rules that govern a body of knowledge.

The business potential of expert systems is in their ability to help reevaluate the decisions a company makes and the rules it uses to achieve decisions, Jones said, and to help come up with rules that are more competitive.

See EXPERTS page 13

Looking for IMS Productivity Tools?

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NEWS

Maximizing benefits of AI a slow process, firm cautions

NEW YORK — Companies seeking to dabble in artificial intelligence techniques must spend a lot of time and energy determining how the techniques will benefit them, and they should be willing to share the proprietary portion of their knowledge.

"It's a very slow learning process. Expect, probably, to spend between a year and two years before you really feel comfortable that you understand what is going on. And — at least in our experience — the amount of time (in which) we feel comfortable tends to be very short," said Roger Jones, planning manager in charge of expert systems at Metropolitan Life Insurance Co. here.

Companies should share their experiences with other people, said Jones, who is experimenting with AI techniques for many insurance applications.

"When you look at an expert system, a very big percentage of the program is for very traditional data processing issues," he said. "There is nothing proprietary about any of that. We have all these various efforts all reinventing the same wheel."

The traditional learning methods

EXPERT from page 12

tive. For example, instead of building a better underwriting system with AI techniques, Metropolitan is using an expert system to change the underwriting system's rules and to determine the impact of the rule changes.

"Since inherent in the [AI] techniques is that the rules are very easily identified and very easily modified, it's a fantastic vehicle for doing that," he said. Those rules will tend to be very secret and proprietary, he added.

Most of Metropolitan's development time is eaten up by trying to understand how to represent knowledge and how to make Prolog's predicates — the AI language's basic building blocks — work the way they should, Jones said. When writing rules in a program, he said, time often is consumed explaining to an expert, from whom knowledge is being gleaned, why the things he forget to talk about when he generalized the rule are important for the program builders to understand.

Developing testing systems

Metropolitan primarily uses Logiware, Inc.'s Mprolog symbolic language and, secondarily, IBM's Lisp/VH symbolic language to develop systems for testing its underwriting assumptions and for assisting actuaries and other experts in risk assessments, Jones said.

The knowledge-based systems run on an IBM 3081 Model K — a machine left over from a previous project — under the VM/CMS operating system with 32M bytes of real storage, 24 channels and an emulation of disk storage devices that comprises approximately 500 spindles of IBM 3360s, although the mixture is made up of 3360s, 3380s and assorted drives.

Metropolitan has 10 to 12 "home-grown" people involved in one way or another in the development of knowledge systems, Jones said.

of reading books and attending seminars do not work well for AI techniques, Jones said.

"We found that we were getting this extremely fancy top-level overview of how wonderful everything was at the seminars, and we stopped going," he added.

Companies should travel a little way down a lot of paths with AI techniques, Jones recommended. A company

must learn to program in the AI languages, but over and above that, it must determine

"The traditional learning methods do not work well for AI techniques."

— Roger Jones
Metropolitan Life Insurance Co.

considering AI should ask the following three questions:

■ Do we have an immediate demand for this technology? Some companies have workers nearing retirement who have expertise that has never been reproduced in the company, and this technology could enable the firm to develop the expertise.

■ What would happen to the company if the competition established a two-year lead in AI techniques? But one would certainly be available in two years, but how long will it take to catch up?

■ Do we want to understand the AI technology instead of having tech that it works? Knowing why the technology works takes time and could be a reason for starting soon.

— Dennis Robinson



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CAD technology is racer's edge for Indy 500 entries

By Clinton Wilbur
CW Staff

INDIANAPOLIS — "Gentlemen, start your digitizers."

When the gravel-voiced race starter gave the send-off to the drivers for the 96th Memorial Day Indianapolis 500, he did not actually substitute the above high-tech version for the traditional four words. But for the first time, defending champion Rick Mears and Penske Racing, Inc. teammates Danny Sullivan and Al Unser were counting on computer-aided design technology to give them the racer's edge in their pursuit of the checkered flag.

Across the ocean in Poole, England, Penske Cars, Ltd. designs and

tests enhancements to its Indy cars with the help of a CAD system from Bedford, Mass.-based Computervision Corp. In a sport where success depends on technology, Computervision has joined Pennell Co., Goodyear Tire and Rubber Co., Bosch Robert Industries, Inc. and more traditional automotive companies in selling expertise to the Penske racing team.

Since last fall, Penske engineers at Poole have used a Computervision CDS 4000 system to design quarter-scale models of Penske race car prototypes for wind tunnel tests of the all-important aerodynamic properties of the cars. The engineers believe Mears' car will handle better because

of improvements made possible through the CAD system.

Computer used for analysis

"We still design the cars with the traditional drafting method, but we use the computer for analysis of the design," said Nick Goones, manager of Penske Cars. "With the CAD you can virtually simulate everything you do on the track."

The Penske CAD system consists of a 38-bit CDS 4000 running Computervision's Cadis 4X design and drafting software packages and third-party analysis programs. Penske engineers design the car models with a high-resolution color workstation and P1000 pen plotter and

have access to 32-bit random-access memory, a 64-bit processor for complex calculations and a 16K-byte cache memory.

Penske saves time and human mistakes by simulating test track conditions with the computer-designed scale models in a 7-by-5-ft wind tunnel. "We input the actual car design into the [CDS 4000] and produce it on the screen, then create the model," Goones said. "We can design the car with a greater degree of certainty after measuring the air flows above and beneath the model. Aerodynamics and aeroflows are [the areas] where we see the single biggest gain."

Goones believes Penske has so far tapped only about 10% of the potential of current CAD technology. In the coming year, the firm hopes to design its own chassis and engine system — it currently uses a March Engineering, Inc. chassis design — in time for the 1986 Indy 500.

"We're definitely on a learning curve," Goones said. "When we first got the machines, we thought we could just plug it in and produce magic, but that wasn't the case. Computervision engineers are still coming here on a monthly basis, and in the next couple of weeks, we hope to have a complete suspension analysis program ready. I think the secret is not in having the equipment, but in knowing what to do with it. We have to make sure we have the right personnel and software to make it work best."

Penske Racing claims to be the only racing team using CAD technology now, but Goones expects that exclusive status to be short lived. March Engineering and England's Williams Grand Prix team are already talking to Computervision about potential purchases.

"Motor racing is one industry where everyone follows a particular leader," Goones said. "If the advantage that we gain from the CAD system is so great, they'll probably all want to get one. Five years ago, no one had heard of carbon fiber [autobody material much stronger and lighter than steel], and now it's standard. I think you'll find CAD will become a facility in the majority of serious racing teams in the next five years."

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Fall Comlease expo scheduled

NEW YORK — The Computer Leasing Conference and Exposition (Comlease), the first national conference and exposition sponsored by the Information Exchange, Inc., will be held from Sept. 30 to Oct. 2 at the Marriott Marquis Hotel here.

Subjects include information on the used computer equipment industry, considerations in leasing, leasing telecommunications equipment and corporate tax treatment of leases.

Registration costs \$395 for the three-day conference. The exposition-only fee is \$10. More information is available from Comlease, 8825 S.E. George Mason Drive, Falls Church, Va. 22041.

MCI accuses AT&T of obstructing equal access pursuit

Scramble to sign customers heats up

By Bryan Wilkins
OF Washington Bureau

WASHINGTON, D.C. — The U.S. Department of Justice has begun an investigation of the equal access implementation process, as MCI Communications Corp. charged that AT&T actively interfered with 61,000 customers who had signed up for MCI service. MCI is involved in a battle with AT&T and other long-distance carriers over establishing market share as equal access is being implemented.

The Justice Department's antitrust division said it has begun an investigation into complaints made by customers — mostly situated in the territory served by Nynex Corp. — that they were signed up to use AT&T Communications when in fact they had not made the choice as required under conditions of the AT&T divestiture covering conversion of local exchanges to equal access.

AT&T responded that it had identified a computer software foul-up in April that led to errors in signing up customers. The company said it had made changes to the programming

and that it believed the problem had been corrected. AT&T contended that invalid customer sign-ups in the Nynex territory had occurred and said it believed that 19,000 businesses with more than one line had been affected.

MCI's charges were contained in a filing with the Justice Department. MCI said, "Grave problems exist with the implementation of equal access ... and no [divested Bell operating company] has established an acceptable prescription order processing system."

MCI asked the Justice Department to require, as a minimum, that the divested Bell operating companies provide prompt notice of acceptance or rejection of a customer order, notification of conflicts guaranteeing on installation of service for the customer, a listing of defaulted customers who did not select a long-distance carrier at equal access outcall and notification of changes in customer selection

after outcall.

MCI told the Justice Department "It is apparent that the [divested Bell operating companies] have failed to devote sufficient personnel and financial resources to meet their equal access obligations ... [and] the beneficiary, of course, is AT&T."

"The [divested Bell operating companies] problems are compounded by AT&T's active interference with the orderly prescription process," MCI added. MCI said it had collected "evidence indicating thousands of bogus AT&T prescription orders from all regions of the country."

MCI asked the Justice Department to begin an immediate investigation of the divested Bell operating companies' practices, an immediate moratorium on waivers enabling the divested companies to enter new lines of business and an investigation of AT&T's order-taking, verification and submission system.

MCI detailed its complaints about

the prescription process on each of the seven regional Bell operating companies and concluded that "[divested Bell operating company] ordering, administrative and installation procedures are unreasonably impeding equal access and prescription competition. Moreover, conflict resolution procedures utilized by several [divested Bell operating companies] provide an opportunity for same interexchange carriers, specifically AT&T, to interfere with prescription implementation."

MCI also said it cannot determine from Bell Atlantic Corp., Bell South Corp. and Pacific Telephone Group these customers that have selected MCI service and said delayed installation are causing lost revenues and loss of customer goodwill toward MCI.

An AT&T spokesman denied the charges that AT&T was actively interfering with the prescription process and called the MCI allegations a "blatant publicity gimmick."

CSI to sponsor July workshop on security

ARLINGTON, Va. — The Computer Security Institute (CSI) will sponsor a computer security workshop conference that will focus on small and large computer systems July 15-16 at the Marriott Crystal Gateway here.

The conference will feature a microcomputer track and an IBM mainframe and compatible track.

Issues to be addressed in the mainframe track include security and control in IBM IMS, VM/SP, CICS and MVS environments. Issues to be addressed in the microcomputer section include securing networks, securing micro-mainframe connections, guarding against the small systems threat to mainframe data and controlling personal computers.

David Kahn, author of *The Codebreakers*, will open the program with a discussion on "The Politics of Encryption."

A total of 24 half-day workshops will be held. A full-day seminar will be held July 14, and five concurrent full-day seminars will be held July 17.

Registration fees are \$495 before June 28 and \$550 after that date for CSI members. The fee for nonmembers is \$535 by June 28. The fee for the one-day seminar along with the workshop registration is \$210 for members and \$235 for nonmembers by June 28. The fee for the one-day seminar only is \$275 for members and \$295 for nonmembers by June 28.

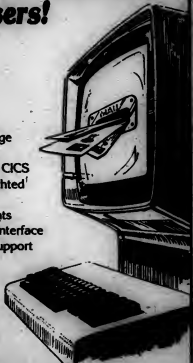
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NEWS



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Industry execs lobby for R&D tax breaks

WASHINGTON, D.C. — Scores of top executives from computer and electronics companies recently visited members of the U.S. Congress to lobby for the 35% research and development tax credit and retention of the capital gains tax cut.

Participating in the American Electronics Association's (AEA) 1985 Capital Caucus on May 16, the executives reported that about two-thirds of the 120 legislators contacted said

they were supportive of the AEA's campaign in favor of pending tax reform legislation, according to AEA officials.

The AEA officials said many legislators indicated that they were receptive to the industry's tax positions because they view high-tech industries as essential to achieving and maintaining high levels of economic growth.

Tomorrow, President Reagan is scheduled to announce his proposal for tax reform, which is expected to retain the R&D tax credit.

Directory of federal DP contractors out

WASHINGTON, D.C. — The first "yellow pages" directory of DP ser-

vices vendors who compete for contracts with the U.S. government was published recently by Donnelly Information Publishing, a subsidiary of the Don & Bradstreet Corp.

The Information Services Directory is the first in a series of Procurement Planning Service Directories. The directory will be provided free of charge and will be an annual publication, company officials said at a recent briefing here.

The directory is intended for use by U.S. government procurement specialists and DP managers, as well as by large businesses that have government contracts and are searching for subcontractors, according to company officials.

More information is available from Donnelly Information Publishing, 2900 Westchester Ave., Purchase, N.Y. 10677.

Martin Marietta wins DP installation contract

WASHINGTON, D.C. — The U.S. Department of the Interior's Minerals Management Service agency recently awarded a \$32 million contract to Martin Marietta Data Systems, Inc. of Bethesda, Md., for installation and management of a DP system.

Under the five-year contract, Martin Marietta Data Systems will upgrade and expand the DP network used by the agency's Royalty Management Program, which collects and distributes revenue from mineral leases. The contract includes installation of an IBM 3081 mainframe, conversion of existing applications software and a data communications network at the agency's facility in Denver.

U.S. agencies' micro buys up

WASHINGTON, D.C. — The General Services Administration (GSA) reported that acquisition of microcomputers for federal government use jumped over 400% in fiscal 1984 compared with a year earlier.

The purchasing arm of the U.S. government catalogued information supplied from all federal agencies and departments as to vendor, model, quantity and cost of micro — those valued at less than \$10,000 — acquired between October 1983 and September 1984.

In fiscal 1983 the government acquired 8,000 micros; in fiscal 1984 the number jumped to 37,277 units, the GSA said. The agency also reported that the costs of acquisition had jumped from \$34 million to \$187 million.

According to Frank Carr, the GSA's assistant administrator for information resources management, the statistics probably underestimate the size of the increase, citing the decentralized federal procurement policies put in place recently which make it difficult to identify all new equipment accurately.

The U.S. Department of Defense reportedly acquired the largest number of micros, numbering 17,419 units in fiscal 1984, compared with 1,834 in fiscal 1983. The National Aeronautics and Space Administration, followed by the Environmental Protection Agency, were second and third, respectively.

IBM was the largest supplier of micros to federal agencies with 10,000 units, followed by Zenith Data Systems Corp. with 5,447 units, according to the GSA survey.

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This system provides the missing link in the personal computer productivity chain by effectively providing "on demand" instructional information on all aspects of using a personal computer to perform processing, analysis, and management functions.

The Expert Series can interface directly with the popular productivity systems, e.g., Lotus 1-2-3, Symphony, dBASE, etc., and can execute concurrently with them or with user-developed applications. Therefore, the user can switch back and forth between the application program and the instructional information without having to restart or reload the application program or the Expert Series System.



The Expert Series is both a product and a service. Cdex will customize the Expert Series to conform to an organization's requirements in terms of subject matter content, relevant skills, business analysis methods, and management functions.

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not been significantly alleviated. This has been due to the fact that existing authoring systems have only provided an assortment of fixed formats, "screen builders," or system-oriented languages for the development of CBT systems.

Cdex has named its CBT Development System the "Electronic Publishing System" because it provides the total solution to designing, developing, and quality assuring CBT systems that are easily transportable to multiple computer systems.

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NEWS

Adapso, computer services firms establish ethics code

WASHINGTON, D.C. — In an effort to ensure higher ethical standards among computer services firms, the Association of Data Processing Service Organizations, Inc. (Adapso) has established a code of ethics. Adapso established the code, by which clients can evaluate a company's conduct, in conjunction with 100 professional services companies.

Computer services firms sold the need for the code was prompted by the sensitivity of the work these firms do. "A professional services firm can be called into a client's company to perform any or all of the following duties: data processing needs evaluation, system selection, custom software development, education and training of DP staff and more and the management of the DP operation," Adapso said.

"This code represents the start of a continuing campaign to promote and ensure appropriate ethi-

cal behavior within the professional services industry," said John Courtney, president of Computer Task Group, Inc. and chairman of Adapso's professional services action board of directors.

"The parameters established have been reviewed and accepted by some of the largest firms in the industry as well as by medium-size and smaller companies. We encourage all professional services firms to endorse the code," Courtney added.

Six principles established

Adapso and the 100 participating professional services firms established six principles. These stipulate that a professional services company and its employees should do the following:

- Exercise independent judgment and objectivity.
- Communicate in a manner that facilitates

clarity and understanding.

- Provide a client with quality service and results.

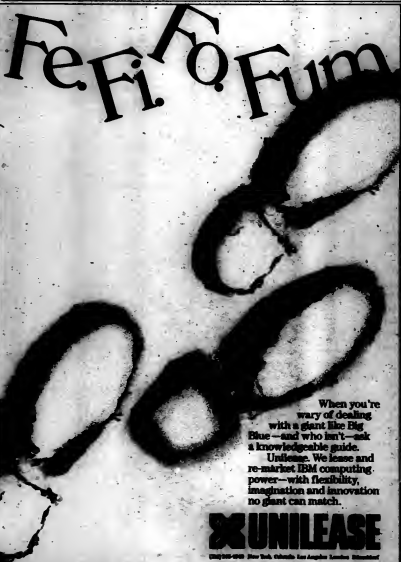
- Demonstrate dedication to the profession.

- Assist in maintaining the integrity of the industry.

- Conduct business in a manner that results in respect and acceptance for the data processing profession and the industry.

The code of ethics discusses each of the principles and highlights the industry's goal to avoid conflicts of interest, conducting computer technology and program, accepting jobs that a firm or personal cannot perform and generally tries to encourage professionalism within the computer industry.

Copies of the code can be obtained from Christopher Carlson, Adapso, Suite 200, 2240 N. 17th St., Arlington, Va. 22209.



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Intech '85 set for Aug. 28-29 in California

SAN FRANCISCO — March 26, the International Information Technology Conference — a two-day conference and exposition focusing on business solutions for corporate information systems — will take place Aug. 28-29 at the Moscone Center here. Intech '85 is cosponsored by the National Users' Association (NUA).

The conference and exposition is geared toward directors of management information systems, data processing, office automation and telecommunications as well as to vice-presidents, of executives, managers and technologists.

Registration prices are \$200 for the full conference before July 15, \$400 after July 15 and \$300 for NUA members. A two-day program costs \$100. More information can be obtained from Intech '85, National Trade Publications, Inc./Suite 400, 2111 Hampshire Ave., Alexandria, Va. 22304.

Workstations focus of meet

SAN JOSE, Calif. — The First International Conference on Computer Workstations, sponsored by the Institute of Electrical and Electronic Engineers, Inc. (IEEE) Computer Society, is scheduled for Nov. 11-15 at the San Jose Convention Center here.

The conference will focus on advanced computer workstations of all types, their software environments, hardware and software technology. Subject fields include distributed systems, computer-aided design and manufacturing, computer-aided engineering, computer-aided software engineering and security issues.

The registration fee is \$150 for IEEE members, \$165 for nonmembers and \$80 for full-time students.

More information is available from Margaret Miller at Software Research Association, Suite 200, 200 Market St., San Francisco, Calif. 94104.

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IRS' payroll system suffering backlog

WASHINGTON, D.C. — The Internal Revenue Service is scrambling to get its payroll system adjusted to its increased workload.

IRS officials publicly confessed that the delays were partly due to a backlog to pay off persons responsible for entering payroll data before a private automated input system was fully installed.

Consequently, IRS employees must wait as long as three months for overtime pay, credits for vacation time and other payroll adjustments, especially at the Austin, Texas, regional payroll center, according to George Elrod, spokesman for the National Treasury Employees Union, which represents the employees. The delays and payroll errors apparently have created seven strike problems at the Austin plant.

Recently being criticized

Steven Fyrel, an IRS spokesman, said the payroll backlog occurred because of an unusually heavy work-

load of processing employee transfers and tax forms. Despite its acknowledgment that IRS' telecommunications team had a permanent reduction of the staff, it has limited payroll data.

In the past, payroll information was reported to the Detroit center via mail or telephone and typed into the computer.

With the automated system, the regional IRS service centers transmit payroll data directly from remote terminals to the Detroit Data Center, which sends its computer tapes to disbursing centers that either issue paychecks or make electronic deposits.

However, three of the 10 service centers have not yet received terminals for the Remote Automated Input System, according to IRS spokesman Ron Young.

To solve the problem, the IRS has authorized overtime work and hired temporary workers for the Detroit center. It plans to complete delivery of the terminals and provide user training by mid-October, Young said.

IRS releases micro-related security book

WASHINGTON, D.C. — A 40-page guide, "Security of Personal Computers and Peripherals," has been released by the National Bureau of Standards (NBS). Since the publication was written for business, government and educational institutions, it contains a lot of technical information, a spokesman said.

The publication documents how to select potential security problems associated with the use of personal computers. It identifies areas of potential vulnerability and presents a general plan of action for companies and government information systems.

Topics include physical and environmental protection systems and data storage systems, integrity of software and data, backup and recovery, security planning and communications protection. Also included are references to self-audit checklist and a guide to security products.

"Security of Personal Computers and Peripherals" is priced at \$1.95. Its stock number is NBS-400-20007-1, and it is available from Department 30-02, Government Printing Office, Washington, D.C. 20540.

ESU publishes telecommuting survey results

WASHINGTON, D.C. — Business Services International (BSI) has published a report on telecommuting information from a survey of telecommuting survey results. The survey was conducted in November 1980.

The report, "Telecommuting: A Survey of Telecommuting Information from a Survey of Telecommuting Survey Results," is published by Robert Marshall Ball Communications Research Corp. and is available to telecommuting and business research professionals. It is available to the U.S. Air Force Institute of Technology.

In addition to presenting summaries of the three surveys, the report reviews definitions, demographics, motivations, attitudes and perceptions related to telecommuting.

The price of the report is \$1,200. More information is available from BSI, 145 W. 56th St., New York, N.Y. 10011.



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NEWS

Computer operator pleads guilty in USDA trespass case

By Mike Suttis
CI Washington Bureau

DENVER — A 36-year-old Los Angeles computer operator recently pleaded guilty to three misdemeanor charges of trespassing in U.S. Department of Agriculture (USDA) computers in Colorado, a federal prosecutor said.

Philip Gonzalez Padriquez, the defendant, entered the plea in U.S. District Court here May 15, after three felony charges were dropped in a plea bargaining with prosecutors.

"The misdemeanor charges are significant be-

cause we wanted to get some convictions under the new law," said Cathy Goodwin, assistant U.S. attorney here.

In 1984, Congress passed the Computer Fraud and Abuse Act, making it illegal to trespass in U.S. government computers (CW, Oct. 15).

The maximum penalty for each charge is up to one year in prison and a \$5,000 fine. Sentencing in the Padriquez case is expected in about a month. Goodwin added that the conviction should have a deterrent value because repeat convictions carry a possible sentence of 10 years in prison.

In February, a federal grand jury here indicted Padriquez. Prosecutors charged that he gained unauthorized access to the USDA's Forest Service computers via commercial telecommunications networks and inserted a "super-user code" to permit continued access (CW, Feb. 11).

Under the plea bargaining, Padriquez forfeits his computer equipment, which was seized upon his arrest, and must issue a statement explaining how he committed the offenses, Goodwin said. She said Padriquez may face other charges in Los Angeles, where an investigation is under way.

DBMS meet scheduled

BERKELEY, Calif. — The University of California at Berkeley's College of Engineering and Department of Continuing Education in Engineering has announced that "Database/86," a five-day course focusing on data base management systems (DBMS), will be presented July 29 to Aug. 2 here.

Prof. Lawrence A. Rowe, a Berkeley computer sciences faculty member, will present papers by 18 authorities from industry and academia concerning products and research. Sessions will be held at the Berkeley Marina Marriott Hotel.

Topics will include data base machines, high-performance transaction systems, distributed data bases, artificial intelligence and data bases, heterogeneous data base systems, design data bases and end-user interfaces to data bases.

The course registration fee is \$1,075.

More information can be obtained from Continuing Education in Engineering, University of California Extension, 2223 Fulton St., Berkeley, Calif. 94720.

Software directory out

SAN DIEGO — The International Data Base Management Association (IDBMA) has announced that the fourth edition of the "IDBMA Application Software Directory" is now available.

The directory lists 630 applications software packages in 93 classifications. The guide includes packages offered by 173 companies and 58 consultants for Pick Systems' Pick operating system. IDBMA promotes Pick-based business computer solutions.

The directory is available for \$30 plus a \$3.50 shipping and handling charge.

IDBMA is located in Suite 210, 9740 Appleton Road, San Diego, Calif. 92131.

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NEWS

Paris hosts Special Sicob '85

By John Gillett
CIS Staff

PARIS — While visitors flocked to Atlanta for Comdex/Spring '85, the French staged their own seasonal computer extravaganza in the prestigious La Defense exhibition area here.

Featuring more than 500 exhibitors of minicomputer, microcomputer and software

products, the six-day Special Sicob '85 conference officially opened May 6 during ceremonies presided over by Hubert Curie, France's

minister of research and technology. More than 150,000 visitors attended the conference this year, according to Max Harnoise, chairman and general manager of Salen International D'Informa-

tiques, Telematique, Communication, Organisation de Bureau et Bureau (Sicob), the show's sponsor.

Special Sicob '85 was founded last year as the spring edition of the 50-year-old autumn Sicob conference, which Harnoise said attracted some 600,000 visitors here in September. Special Sicob '85 offered 60 sessions designed to introduce attendees to the use of microcomputers and software in the home and business.

In the center of the Special Sicob '85 exhibit floor, visitors explored Sicob Info, the so-called Village of the Professionals. Sicob Info consisted of 12 industry-specific pavilions manned by professionals in fields as diverse as tourism and government. Sicob Info staff members gave attendees practical advice on selecting hardware and software and provided information on vendors offering appropriate products.

That same information was also available to other visitors through 66 Sicobtel videotex terminals located throughout the exhibition. The terminals provided access to a data base containing information on exhibiting vendors and their products.

In conjunction with Special Sicob '85, the French government agency, Curvefour International de la Communication (the International Congress of Communication) sponsored Talking Machines '85, touted as the first international conference on speech technology. The show featured about 50 vendor and academic groups exhibiting research efforts in speech recognition and synthesis.

Among the projects exhibited at Talking Machines '85 was a prototype telephone booth developed by the Centre National d'Etudes de Telecommunications, France's center for telecommunications studies, which is the research arm of the French Postal Telephone and Telegraph agency.

The booth has no standard telephone equipment, but it allows users to say a phone number into a mounted microphone. The number is automatically dialed, and the user converses via the microphone and a wall speaker.

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NEWS

French apply high technology to their everyday lives

By John Dattani
OF THE

The following are scenes from France — high-tech postcards, if you will.

While their students enjoyed the Easter vacation, French schoolteachers gathered to augment themselves with what will soon be an important part of their classrooms — microcomputers. Playing the role of students, the teachers began to learn how to impart the basics of computer literacy.

The French government has placed orders for 120,000 micros — mostly manufactured by French companies — and related software to be installed by 1986 in schools from cosmopolitan Paris to the quaint villages in the country's wine-growing regions.

In lieu of a telephone book, a Frenchman turns to the Minitel terminal on his desk and types in a request

for a phone number. The Minitel is a small, dumb terminal attached to the telephone and provided by the French Postal Telephone and Telegraph (PTT) agency. In addition to replacing the phone book for some 700,000 current users — a figure that is expected to grow to three million by 1987 — the Minitel provides access to a variety of informational data bases supplied by third-party vendors through the PTT. The phone number data base alone currently consists of approximately 22 million listings.

A businesswoman walks into a Croissade 2000 (X2000) Center in the Defense section of Paris, leafs through menu product literature and proceeds to operate a vendor-supplied micro. The X2000, a government-sponsored agency affiliated with the larger Agence de l'Informatique (ADI), currently operates a network of roughly

180 such centers designed to introduce all types of people to computing.

In addition to conducting seminars on the use of micro in the home and in small business, the centers provide access to a variety of systems and software for users to try. Plans are to extend the network to 1,000 centers by the end of 1986.

99

"We decided to make everyone aware of the importance of computers as something they can understand and dominate. The purpose is to give everyone awareness and knowledge."

—Olivier Marrec
ADI

An architect stands before a detailed miniature version of the city of Paris. He points to the model of a building in the Defense section that lies directly down the Avenue Charles de Gaulle — a straight line to the Arc de Triomphe. The towering, innovative, cubic building will be the home of the International Crossroads of Communication agency when it opens in 1986.

The government-sponsored agency, its supporters say, was born of a recognition of the growing importance of communications technology. Its primary goals are to train French citizens in the use of modern technologies and to spur innovation in communications.

What these postcards have in common may not be visible on the surface. Underlying each of the scenes is the French national commitment to apply available computer technology to day-to-day life. ADI President Olivier Marrec said, "We decided to make everyone aware of the importance of computers as something they can understand and dominate. We are not trying to train a generation of computer professionals. The purpose is to give everyone awareness and knowledge."

To those accustomed to reading about fifth-generation projects, high-end IBM Sierra-class mainframes and U.S. Department of Defense-approved Ada compilers and programming environments for mission-critical applications, France's efforts may appear distinctly "low tech."

But on closer inspection, the merits of the French approach become more obvious. The French have recog-

nized that computer and communications technology is rapidly encompassing all facets of everyday life. Are there not strategic and commercial advantages to be gained, they contend, by preparing the populace for the increasingly computerized world of the near future?

Compare the situation in the U.S., where, for example, computer education in public schools varies in quality, depending on the relative wealth of the community that supports the schools or on the benevolence of computer manufacturers. That is hardly the proper method for ensuring the spread of computer literacy. The ana-

logic home computer market may be just one testament to the ineffectiveness of that laissez-faire attitude.

The French plan to share the wealth of technology is likely to be ignored amid all the news of leading-edge advances in computers and communications. The U.S. will likely be recognized for some time to come as the world leader in information processing technology. But as the current administration pursues magnificent funding for space weapons and other high-tech armaments, it might be wise to remember that a nation's most important asset is its people.

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NEWS



BELGIUM

BRUSSELS — The Society for Worldwide Interbank Financial Communications (Swift), announced the delay of its network conversion from Swift I to Swift II. The delay in converting the intercontinental banking network is attributed to Burroughs Corp., the main systems supplier for Swift. Burroughs reported that testing its communications processors took longer than expected. The network conversion is now slated to

take place during 1995.

CHINA

BEIJING — Tianjin Computer Corp. will mass-produce 16-bit microcomputers here under the terms of a recently signed agreement between General Robotics Corp. and the Coordinating Committee for International Security Export Control in Paris.

DENMARK

COPENHAGEN — A validated Ada compiler is being jointly developed here. The Commission of European Communities (CEC), an international consortium, announced that a \$1.2 million development contract was divided among three companies:

STC Ltd. in Norway, which will be the primary contractor, Britain's International Computers Ltd. and Dansk Datacenter in Denmark.

FRANCE

PARIS — Although created in France, the Ada computer language has had difficulties in this market. At a recent Ada seminar held here, it was revealed that only two French software firms offer Ada products, one of which is the company founded by Jean Ichbiah, who developed the high-level language while working at Bull. One of Ada's main obstacles in the market here is the French Ministry of Defense, which promotes the use of LTR5, an advanced language developed in-house, as opposed to Ada.

JAPAN

TOKYO — Kokusai Densetsu Denwakuha (KDD), an international telephone company based here, has developed a communications method for transmitting voice and color moving pictures at 64K bit/sec. KDD's video communications method integrates 1.6K bit/sec. video signal and 48K to 64K bit/sec. color moving pictures, the company said. The transmission problem involves color information related to brightness and color variations and is able to transmit a condensed image, KDD said. Testing is expected to be completed over existing lines this year.

TOKYO — Lotus Development Corp. recently announced the establishment of a wholly owned subsidiary here called Lotus Development Japan. Lotus also announced a joint development agreement with Kamei Kogaku Kenkyusho Ltd. (KK), a Japanese software house based here. Lotus plans to incorporate KK's Kasei-Kang conversion technology.

MEXICO

MEXICO CITY — Only 68% of large companies in Mexico use computers, according to Computerworld Mexico. Of the medium and small companies here, only 6% to 7% reported using computers.

In firms using computers, however, demand is rapidly escalating for data processing, payroll and storage. Many of these companies are maintaining data bases of two million to five million lines of Cobol code.

NORWAY

OSLO — Norsk Data AS has joined the growing list of computer vendors offering front-end or related options for their processors. The company recently announced the Pank Performance Extension, an add-on that enables users to share files, disks and peripherals among two or more of the vendor's minicomputers, building redundancy into the system without adding another processor.

WEST GERMANY

KARLSRUHE — Software programs will now have the protection of copyright laws here. According to a May 13 announcement from the Supreme Court of the Federal Republic of Germany, programs will be protected by law if they are proven to be "personal intellectual creations."

KARLSRUHE — A shortage of qualified personnel is the most pressing problem for DP managers here. According to Heide Streicher of the consulting firm BOS GmbH, which conducted a poll on the subject, this situation will not improve in the near future. Finding experienced analysts and DP managers presents the biggest problem, Streicher said, and most companies (58%) wind up promoting people to these slots from within the organization.

In conjunction with this trend, the policy in 80% of West German DP departments is to encourage continued education and training for their employees.

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NEWS



CALENDAR

WEEK OF JUNE 23

JUNE 24, ORLANDO, FLA. — **Symposium Macroeconomic.** Contact: Harris Education Center, Suite 507, 6230 S. Orange Blossom Trail, Orlando, Fla. 32808.

JUNE 24-25, ORLANDO, FLA. — **CROS Systems Convention and Training.** Contact: Harris Education Center, Suite 507, 6230 S. Orange Blossom Trail, Orlando, Fla. 32808.

JUNE 24-25, NEW YORK — **System and Telecommunications in the Northeast.** Contact: Telestrategies, Inc., P.O. Box 811, McLean, Va. 22101.

JUNE 24-25, NEW YORK — **Managing Systems Projects.** Contact: New York Uni-

versity School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

JUNE 24-25, PARSHIPANTY, N.J. — **Vasm in Control.** Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JUNE 24-25, VANCOUVER, B.C. — **Auditing in a Data Base Environment.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JUNE 24-25, NEW YORK — **Videocon '85 International Conference and Exhibition.** Contact: Online Conference, Inc., 908 Ave. of the Americas, New York, N.Y. 10018.

JUNE 24-25, BOSTON — **Participates for Auditing.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

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JUNE 24-25, BOSTON — **Audit and Control of CROS.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JUNE 24-25, BRUSSELS — **International Electronic Printer Industry Conference.** Contact: Stephen Pytko, C. A. Pencil Associates, Inc., One Snow Road, Marshfield, Mass. 02050.

JUNE 24-27, SAN ANTONIO — **CROS/FA Applications Design.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JUNE 24-27, LOS ANGELES — **From Start to Finish.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JUNE 24-27, SAN JOSE, CALIF. — **Network Management/Technical Conference and Exposition.** Contact: Network Management/Technical Control Conference and Exposition, P.O. Box 800, Framingham, Mass. 01701.

JUNE 24-27, WASHINGTON, D.C. — **IBM/IBM (M/1) Application Programming.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JUNE 24-28, NEW YORK — **Workshop in Data Base Audit and Control.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JUNE 24-28, ORLANDO, FLA. — **CROS Programming Workshop.** Contact: Harris Education Center, Suite 507, 6230 S. Orange Blossom Trail, Orlando, Fla. 32808.

JUNE 24-28, WELLESLEY, MASS. — **System Analysis Workshop.** Contact: QED Information Sciences, Inc., P.O. Box 181, Wellesley, Mass. 02181.

JUNE 24-28, CHICAGO — **CROS Internal Architecture.** Contact: Syntex, Inc., 35 W. 35th St., New York, N.Y. 10001.

JUNE 24-28, NEW YORK — **Vasm.** Contact: Syntex, Inc., 35 W. 35th St., New York, N.Y. 10001.

JUNE 25, CARY, N.C. — **SAS Services Workshop.** Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

JUNE 25-27, NEW YORK — **Effective Management Techniques for Data Processing Managers and Project Leaders.** Contact: Abbott, Galvani Association, 1860 Union St., San Francisco, Calif. 94123.

IN DEPTH



So now you're a manager

By R. E. Nienburg
and M. C. Steele

The move from a professional position to one in management is almost always viewed as a promotion in today's business world. Such a move generally results in greater responsibility within the organization and greater influence on its success.

Unfortunately, it is not always recognized that such a promotion represents a dramatic change. Here is a person, presumably doing a better than average job in a profession that required four to six years of training, who is entering an entirely different profession — with no training whatsoever. How is a program-

mer or engineer or mathematician supposed to have become skilled in the art of managing people and projects? By osmosis?

Because managers generally command higher salaries, we tacitly admit that their jobs are tougher, but where is the equivalent for the management job of the years of training the employee needed to become competent in the technical assignment?

Make no mistake: The skills required to succeed at the professional job are not the skills needed to perform well after the promotion to

IN DEPTH/YOU'RE A MANAGER

management. A true identity change is necessary. The way the individual goes about that identity change has a lot to do with how quickly and successfully the transition is made.

New identity

The need for a new identity can most readily be understood by comparing what constitutes success for the new manager with what was successful behavior before the promotion. Success criteria for the new manager are based on the success of the group managed, not the manager's personal contribution. The new manager's preoccupations should be with the group's effectiveness, not personal effectiveness.

Stated differently, the primary focus of a manager should be on the process of getting the job done, not on doing it personally. The manager makes a more meaningful contribution by concentrating on those responsibilities uniquely the manager's than by simply acting as one additional individual contributor.

Unfortunately, a brand-new manager is rarely given a comprehensive view of what those unique responsibilities are or what constitutes successful behavior in the new role. The management role can be taught. The transition from productive technical person to good leader need not be an ad hoc reaction to environmental pressures. The process of building a new role model — because that's what we're really doing — can be the result of formal learning, introspection and guidance.

We all carry, either subconsciously or as a result of a deliberate thought process, a set of beliefs and convictions about what our jobs are. This set of beliefs and convictions determines our reactions to external stimuli and how we will respond to various day-to-day pressures. It pro-

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The management role can be taught. The transition from productive technical person to good leader need not be an ad hoc reaction to environmental pressures. The process of building a new role model can be the result of formal learning, introspection and guidance.

vides a mental model of how we see our roles — hence, a role model. It is a prototype that gives an element of stability to our actions.

Now consider the plight of the brand-new manager, whose role model had been the good technical citizen. Suddenly, that role is no longer the most productive. If the old role model is simply discarded, what remains may be, at worst, a void, or at best, some partially formed ideas based on observations of managers in the immediate area. Unfortunately, we have all been exposed to too many managers whose role model changes from day to day, or worse, from situation to situation.

View becomes reality

There is a lesson regarding self-fulfilling prophecies that comes from the Pygmalion theory: stated simply, it says that the view you hold about your role as a manager will determine what kind of a manager you become.

Unless you are one of the fortunate few working for a truly competent leader who will guide you through the transition and who serves as a model, you are on your own. Without some study and conscious thought, you will probably arrive at a management model as a reaction to the environmental pressures you experience from day to

day. Not only will you learn some pretty bad habits, but it will take you considerably longer to arrive at your management style.

If, on the other hand, you develop your role model as a result of conscious study and introspection (and, where possible, thoughtful outside guidance), this crucially important transition can be a rational process. The amount of time during which you are operating with an obsolete model (or a void) can be minimized.

It's not unlike learning to ski. You can buy the equipment and hit the slopes without any preparation; you might even survive. You can just follow some other skiers around and see how it's done. Just please ski on some other slope.

The transition

The manager has special responsibilities that will make the group more productive over the long haul. These tasks include:

- Establishing and/or clarifying the group charter.
- Instituting clear, measurable goals and working for their acceptance.
- Developing subordinates.
- Providing a sense of job satisfaction for subordinates.
- Continually improving the work process and environment.

The manager is the only group member in a position to accomplish anything of substance in these important areas. If the manager does not attend to these areas, no one will. Because the long-term effect of attending to such matters is very positive, it follows that a manager's role should include them.

There is an another critical point to consider when deciding who you really see as a manager. You should be just as concerned with what the job responsibilities are as with what they are.

The sometimes overwhelming temptation to hold on to too many of the tasks that were yours as a technical person, because you were comfortable doing them, is an insidious trap. Don't divert yourself of all technical work. After all, you were promoted because of your contributions on the technical side. But you are now in a position to spread your experience over a larger segment of the organization.

Recognize that your first priority is the long-term productivity of your people. After attending to your first priority, apply your experience where it will do the most good.

Prototype role model

A wealth of written material can be studied in pursuit of an effective role model. Unfortunately, much of this information creates the illusion that a manager's job is a never-ending cycle of planning, organizing, coordinating and controlling.

Although these functions are critical, knowledge of the functions gives no insight to understanding what an effective manager actually does.

Everyone does not do directly in trying to formulate a model of the day-to-day activities that constitute a working manager's day.

In a landmark study, Henry Mintzberg recognized the fallacy of defining the managerial role solely by functions, and he set about correcting it. Through an in-depth study of what effective managers actually did with their time, he began to formulate a role model. His prototype does not necessarily represent how things ought to be, but what they actually are.

Mintzberg's assertion was that most managerial actions can be categorized as one of three specific roles: interpersonal, informational or decisional.

Interpersonal roles:

Figurehead — performing "ceremonial" duties.

Leader — training/motivating/encouraging/reconciling individual needs with the goals of the organization.

Liaison — interfacing with peers and other people outside the unit.

Monitor — scanning environment for information and receiving unsolicited information, often as gossip, hearsay and speculation.

Disseminator — sharing information with subordinates who would otherwise have no access to it.

Spokesperson — sharing information with people outside the unit; informing influential people who affect the functioning of the unit.

Decisional roles:

Entrepreneur — seeking to improve the unit, adapting it to changes in the environment.

Disturbance handler — responding to pressures/changes beyond the manager's control.



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Resource allocator — defining who will get what within the unit; allocating time, including your own; authorizing important decisions.

Negotiator — mediating between members of the unit and negotiating with managers of other units on decisions affecting joint projects.

How might such a model be useful in your pursuit of a role model? It can certainly serve as a suggested format; but more important, it can be adapted to a variety of specific situations. By carefully considering the needs of your current job, you can use the model as a checklist and borrow the roles that seem important; the others can be relegated to second-order values. The result is an effective beginning to a conscious, deliberate conclusion about how you want to manage, and hence, how you will manage.

It was asserted earlier that a manager can make a more meaningful contribution to group effectiveness by tending to the unique managerial responsibilities than by simply assuming the role of one more group member.

The principal justification for this assertion is that a highly motivated group will produce more output than a poorly motivated one, up to two or three times as much. If you are managing a five-person group and take on the role of sixth group member, you can increase group output by an additional 30%. If, however, you apply these skills that result in a well-motivated group, you can double or even triple the output over that of unmotivated employees.

As a first- or second-line manager, you can have a direct, first-order impact on morale. Most of what can

be done to provide maximum job satisfaction for your people doesn't require getting anyone's permission or producing a cultural revolution. Providing satisfaction requires only some basic, learnable, people-oriented techniques: motivation, delegation, participative management and communication.

What is motivation?

About 20 years ago, Frederick Herzberg wrote a paper on motivation that should be required reading for anyone who wants to become an effective manager. One of his principal points is that there is a difference between things that motivate people and things that demotivate them — that is, motivators and demotivators are not opposite sides of the same coin.

The history of industry efforts to

motivate people began with such measures as giving employees more time off (ending the 54-day work week) and proceeding to more pay, more benefits, better communication downward, better two-way communication and so on.

After each step, an astonishing fact was clear: The question, "How can we motivate our people?" still persisted. What became apparent was that these measures were essentially broken to continue working, not true motivators to work harder. They could be likened to attaching a battery to keep it operational, when what was desired was to install a self-starter in employees so they would work harder because they wanted to work harder.

So the question of what motivates people persisted. And finally, someone said, "Let's go ask them."

A series of in-depth interviews was conducted that asked two general questions: Think back over your working career and recall events that made you feel good about your job — What were the things that made you feel positive about getting up in the morning and going to work? The second question asked people to identify events that made them feel the opposite.

For each event identified, the interviewer explored further to isolate factors that caused these positive and negative reactions. The results are important to any new manager and should be basic to every management development course.

Mentioned most frequently along with "good" events are motivators; mentioned most frequently with "bad" events are demotivators.

Why are these findings so significant to first- and second-line managers? Because the top motivators identified by the study — achievement, recognition and advancement — are under your direct control. You can do something about them without having to get anyone's permission. And the demotivators are the factors that produce the self-starters. Let's carry out these motivators a little further:

- **Achievement.** — Set realistic but challenging goals to generate a sense of personal success.
- **Recognition.** — This can range from a simple thank you (best done in public) for a job well done, to an award of a group lunch or a formal letter of praise.
- **Advancement.** — Besides formal promotion, consider giving assignments of increasing responsibility or delegating some of your management tasks as a training opportunity.

The important point is that you use the motivators. Working these factors into your management style can pay enormous benefits in terms of group effectiveness, as well as making you a leader for whom people would like to work.

Leveraging the art of delegation can make the difference between a mediocre manager and a good leader, between a disgruntled, bickering group and a high-morale team. Delegation is easily taught but seems to be seldom practiced.

What is delegation?

Delegation is not a casual request to a subordinate, such as "Give me a hand with this, will you?" It is not passing a five-minute chore to someone as you meet in the hall. To realize maximum benefits, the delegation process must be careful, deliberate



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and significantly more formal. The objectives of delegation are to:

- Make the best possible use of the total energies and capabilities of your organization.
- Do work and make decisions at the lowest organizational level capable of performance acceptable to you.
- Free yourself as much as possible to concentrate on your own functions.
- Match tasks to be done to the growth needs of your people.

There are four formal steps in delegation: planning, contracting, tracking and terminating.

Planning — define the responsibility.

A careful review of your organization's total work load should reveal a work structure or logical task breakdown. After considering the work structure and delegation objectives, identify specific tasks to delegate. You must explicitly define task objectives and what deliverables are to be produced. Objectives and deliverables must both be expressed in measurable terms. What constitutes success cannot be ambiguous.

Consider the talents, experience levels and desires of your subordinates, and match tasks to people. Selection of the right person is an important aspect of delegation. Availability should never be the only criterion. It is better to change assignments to achieve a good match than to make a poor assignment.

Selecting the appropriate level of authority to delegate to the person chosen is another important aspect of delegation. For example, do you want the person simply to gather data for you to make the decision? Do you want someone to recommend a decision or just complete the assigned task and report back the results?

Finding the appropriate authority level depends on such factors as the experience level of the person chosen, the amount of control you feel the task demands and your level of trust in the success of the communication.

Contracting — communicate the responsibility and authority; fix accountability.

Armed with task objectives and measurable success criteria, hold a negotiation session with the people to whom you are delegating tasks. Bring them completely into the picture; present all the background information that you would use if you were to do the task yourself. Discuss explicit objectives and deliverables along with the specific authority level you are delegating.

The contracting phase includes fixing accountability. You and the person you assign negotiate an agreement about the amount and type of information to be provided to you as work progresses. This is your means of delegating authority without losing control.

Periodic progress reports, delivery of interim results and successful completion of milestones are examples of techniques you can use to ensure that the task is on track. Make sure that your expectations are expressed and documented so neither of you will be surprised along the way.

The last step of the contracting phase requires that you solicit feedback. Getting feedback ensures that your expectations are understood and accepted. Make sure the person

has everything he needs to succeed and that he can and will do the job. This process not only ensures that communication was good, but it also produces a sense of ownership on the part of the delegatee for the job to be done.

Tracking — check progress toward goal.

Once you and the delegates have agreed upon the job, the success criteria and means of accountability, you must have a mechanism to ensure that commitments are kept. Sloppy, permissive tracking produces a group culture that doesn't care much about pressures. You can generate a professional, business-like attitude toward all intergroup commitments by relatively simple follow-up techniques.

Terminating — recognize accomplishment.

Completing a task allows the opportunity to provide feedback, counsel and recognition. One significant side benefit of skillful delegation is the sense of personal accomplishment delegates receive from reaching clear, relevant, realistic goals.

Benefits of delegation

Aggressively and correctly pursued, delegation can fire up a group. When people believe they have a significant piece of the action, when they can see the connection between their efforts and organizational success, there is a commitment and dedication to group goals that optimizes group performance.

Proper delegation encourages people to grow. By delegating increasingly responsible tasks and greater authority, you provide goals that are enormously satisfying and motivating.

Furthermore, your opportunity to coach and provide positive feedback raises both trust levels and group competence.

But first and foremost, proper delegation gives you more time to manage. As your people grow and feel comfortable with your style, decisions will be made at lower levels, intergroup cooperation will increase because roles are clearer and the need to check everything with you will decrease.

Obstacles to delegation

If the art of delegating is so straightforward and the benefits so clear, why isn't it used more frequently? The reasons include the following:

■ An up-front time investment is needed to produce a well-informed group to whom delegating high-level

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tasks is reasonable.

Each task requires an up-front time investment for the formal delegation steps outlined above. Your initial reaction may be, "It will take me more time to delegate than to do it myself." That may be true the first time or even the first three times, but in the long run proper delegation will give you more time to manage.

You may fear losing control — "the ultimate responsibility is mine and can't be delegated; therefore, I'd better do it myself." (Pray for 68-hour days, an understanding family and limitless stamina.)

A new manager is sometimes uncomfortable getting his sense of accomplishment through the efforts of others and may feel a continuing need to demonstrate to superiors management the same kind of output that earned the promotion to manager.

Finally, there is the security-bliss syndrome: "If all the intellectual work that I understand so well is delegated, what will be left to do?" That is a truly groundless fear, for there is so much to do in the managerial realm.

Participative management

Participative management is another technique that you should thoroughly understand as you develop a role model. While it is discussed by many as a self-evident technique, so practiced, it covers a broad range of approaches.

Two specific views bear mention. Participative management is: Definition 1: Ensuring that every-

one affected by a decision is fully informed about the reasons for the decision, brought into the picture about their expected roles and given an opportunity to discuss the best way to reach the objectives that have been established.

Definition 2: Providing an opportunity for all group members to share in deciding both what is to be done and how best to do it.

It is interesting to note how frequently people use definition 1 when thinking of their subordinates and definition 2 as the style they expect of their bosses. In fact, definition 1 is a laudable practice. An informed group is in a much better position to operate with wisdom when unforeseen circumstances are encountered. It is not, however, participative management; it is good personal relations.

The objectives of participative management are twofold: to involve your group in the process of making decisions so as to tap their experience and expertise and arrive at the best possible decisions; and to give group members a sense of ownership for the decisions made and a sense of responsibility to meet successfully the objectives defined.

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You need to recognize when an intended message is being distorted by emotions; then deal with the feelings first, before attempting to get to the intellectual part of the message.

This is not to advocate majority rule, democratic voting, permissive management and so on — simply involvement in the decision process. Involvement does not mean decisions must be unanimous. It doesn't mean compromise so that everyone is equally unhappy. It means involvement.

Even in those instances when a person loses a hotly contested point, being involved in the process and having his point of view heard is important to a sense of having some control over one's destiny.

A good participative manager:

- Gives subordinates a share in decision making whenever possible and actively seeks group help in arriving at directions.

- Communicates effectively with the group and keeps subordinates well informed about any issues affecting decisions and group direction.

- Ensures that crisis decisions are made and acted upon and interminable debate is avoided.

- Actively works at maintaining high group morale.

- Works at developing subordinates to take on more responsibility.

- Listens, is approachable and

willing to make changes in the way things are done.

- Is supportive of subordinates even when they make mistakes.

One caveat must be included. If an issue is not negotiable, either because you have already made a firm decision or because a decision has been handed to you as not negotiable, don't attempt to debate the group into thinking they are involved in making it.

In such an instance, simply be honest — present the decision in its true light. If you didn't, the group may not come to the decision that you want, leaving you in the position of having to say, effectively, "I don't care what you think, we're going to do it my way."

In other words, you appear willing to negotiate when in fact you're not in a position to do so. You will be spotted as a phony very quickly, and your credibility will be badly damaged.

Art of communicating

If you can't communicate effectively, you probably won't succeed as a manager. It is unfortunate that this skill is one of the more difficult to acquire by solitary reading, with no opportunity for classroom guidance, role-playing experience, observed behavior and so on. Being aware of some of the generally accepted principles may be helpful, however.

When communicating with subordinates, you, as a manager, should accept primary responsibility for effective communication. By virtue of your managerial role, you are in a

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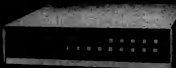
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better position to control the conversation than the subordinate. Also, because communicating effectively is such an important portion of your manager's arsenal, it is something you should be expected to practice.

You need to recognize when an intended message is being distorted by emotions; you must deal with the feelings first, before attempting to get to the intellectual part of the message.

Acceptable behavior

The most effective way to deal with feelings is to establish that it is acceptable behavior to be open about feelings; you must be open about your feelings as a standard mode of operation. If you are, it invites openness on the part of your group; reacting to and dealing with feelings becomes much less threatening.

By setting an example, it is possible to acknowledge emotions that interfere with good communication and defuse them first. Doing so usually permits both of you to proceed with the job of understanding the real intent of the message.

There is a specific technique, called active listening, whose objective is to facilitate the defusing process. It takes some practice to become adept at using the technique.

Opening up

To some degree, the term active listening is a misnomer, because it is not concerned with the mechanics of listening. The technique is intended to open up the sender by responding in a particular manner to an emotional message. What you are attempting to convey when practicing the technique is the following:

■ You are aware of the feelings of the sender; you recognize anger, disappointment, frustration or whatever the projected emotion appears to be.

■ You care about those feelings and do not sit in judgment of the sender.

■ It is perfectly all right to deal with the feelings first; we'll get to the cognitive message afterward.

The way in which these messages are conveyed differs depending on circumstances, but basically it is a question of mirroring the sender's emotions back to the sender, with a completely nonjudgmental statement, and then waiting for confirmation and a response indicating a willingness to deal with your perception. The effect is generally a reliable cycling down of the distortion caused by the disturbing emotions.

Defensive reactions

By contrast, there are times when a new manager can be the cause of distortion

without realizing why. Messages to a peer that were completely accepted the day before your promotion to a managerial position can produce defensiveness that inhibits communication the day after the promotion. By virtue of your role as a manager, the same message takes on a different meaning. This happens most frequently when the message is perceived as judgmental rather than objective, or as indicating superiority rather than

equality or as being manipulative rather than problem oriented.

The strain must be on what is perceived. There is a much greater tendency to read judgment and superiority and manipulation into the messages of a manager than into those of a nonmanager. You must cultivate a sensitivity to these defensiveness-provoking attitudes.

As with most human precepts, the more skilled you become as a manager, the

higher the financial and ego rewards. It may well be true that you are born with an innate management skill level. A conscious effort to learn and improve your abilities will enhance the chance of living up to your potential.

Management skills, like technical skills, can be acquired. You must view management as a new career, however, and you must exert the necessary energy to master it.

About the authors

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VIEWPOINT

Akihabara in a bag? Only in America



LIBRARY
BY GEORGE
CHAPIN P. LIGHT

Part two of a two-part series.

Two weeks ago I told of how I bought a laptop computer in January and how my plan to use it on flights between New York and Tokyo were thwarted because of the unavailability of an RS-232 cable needed to transfer its files to my two hand-held desktops.

The cable's manufacturer said it was "soon to be available." Until it was, all the data I entered into my laptop had to be re-entered into the desktop I used to archive my work.

I crossed the Pacific six times during the next several months, and at least a dozen times I contacted the laptop's manufacturer to ask about the cable's availability status. I awaited arrival of the day when "soon" would become "any" with assurance, and I tolerated the lying and rebuffing of my in-flight work with the same determination characteristic of a mule in pursuit of a worthy cause. Only when I received an announcement of my system's rescuer was my faith shaken — surely they'd finish its predecessor before delivering a new system, so why was my shining cable still classified as "soon to be available"?

In my fast-moving computer industry, an announcement of a successor system usually indicates the abandonment of its predecessor, so I accelerated my efforts to pressure the manufacturer to make good his promise to make the cable available soon.

It seems the manufacturer forgot I was alive.

Light is chairman of Light Sciences, Inc., a New York-based think tank specializing in computer and communications technology.

With each query I made I got the impression that not only had he decided to lay the previous system to rest, but he wished I'd join it.

"When I received my last 'soon' I told myself I would never again use the machine without the cable and embarked upon a full-blown quest for it. I vowed not to return without it, deemed my Indiana Jones but not headed for Akihabara — Tokyo's great marketplace — where I knew it could be found, where anything electronic can be found.

It was hot and crowded in the Akihabara-Mitake subway station when I and my colleague, James, descended to descend to take the train to the stop

The latest of everything you've read about as 'soon to be available' has been at Akihabara a long time. It's no wonder they say, 'If it can't be found in Akihabara, it can't be found.'

near Akihabara. Akihabara is amazing because virtually every commercial establishment in view sells consumer and/or commercial electronics of some kind, ranging from the jewelry, clothing, food, furniture, automotive, office supply and carpet stores Americans are accustomed to seeing. The latest of everything you've read about as "soon to be available" has been there a long time: home appliances that talk; video and audio equipment; robotic devices that crawl, climb or simply walk around looking for something to do, unaddressed by Ray Bradbury when he wrote *Martian Chronicles*; music synthesizers that produce the sounds of every instrument; photo-copiers that merge everything from radio to cal-

culation and other computing equipment. It's no wonder that so electronics go, they say, "If it can't be found in Akihabara, it can't be found."

Behind the large, well-known department stores on Akihabara's side streets and in its alleys are scores of other stores that sell almost everything found in Akihabara more cheaply. Most feature specialties otherwise not found: components, connectors, cables, wires, pins and even chips. The smaller the shop, the more shops; the smaller the shop, the more likely you are to find the unfathomable. That's why we headed into the maze of tiny shops on whose shelves and in whose booths are the tiniest, rarest and most difficult to come by electronic components there are.

We did not spot Japanese, so the quest still wasn't going to be easy. Our sign language obtained responses of perplexed confusion, shrugs and even disgust. We could not understand the continuous break-offs we were getting; it seemed as though we were requesting something illegal. Only one person whom we approached spoke to us. In halting English, he said, "soon to be available, maybe in America." We knew we had failed.

Two days later we boarded a 747 jet for New York, and 14 hours later I was entering my apartment home, tired and carrying my new-to-be-laptop laptop in whose random-access memory was a new essay, one which I intended to discuss with the latest system. As I opened the door to my building, I literally ran into my TV repairman. He asked me why I had told him I had a broken-to-be-laptop in whose random-access memory was a new essay. "Hold your horses," he said. He knelt before me, opened his TV repair bag, stuck his hand into it and said, "surrounders" as he produced the video camera I needed. "What did you get it? Why are you carrying it around?" I asked. "I really don't know," he replied. "I've been carrying this silly thing around for five months wondering what it was for. Keep it!"

Only I, I suspect, I thought the Akihabara carried around in a TV repairman's bag.

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MANAGEMENT
WILLIAM F. COLE

You've heard the saying, "A little knowledge is a dangerous thing." It's the kind of thought that comes to mind when someone in your department (parent company excluded, of course) comes back from a management seminar. The problem isn't with the seminar: It's with how much, or really how little, of the information presented actually gets back to the department and is properly applied within your company. Like all things newly minted, the concepts are shiny but somewhat hard, cold and sharp-edged. It takes some circulation to warm them up, mute the tones and soften the edges.

It's easy to spot a recent seminar attendee — the person talks funny. In this person's parlance, managers don't help people do jobs, they "facilitate soft resources." Instead of saying, "I want to talk to you about

Bill," you hear, "I'd like to share with you some of my nonaffectionate perceptions regarding your chief senior analyst resource." Usually, the seminarists wants to become an investigator. This is done by conducting an "exploratory study" — translated, that means he wants to nose

will turn red in the face and refuse this instruction outright, but most will simply go along in the hope that the whole scheme will run out of steam in short order. Usually, some new idea pervades of their gets added to the existing load of paperwork, the data gets collected, the project

Recent seminar attendees talk funny. In their parlance, managers don't help people do jobs, they 'facilitate soft resources.' Instead of saying, 'I want to talk to you about Bill,' you hear, 'I'd like to share with you some of my nonaffectionate perceptions regarding your chief senior analyst resource.'

around in your well-oiled operation. To conduct the study, the inept prospective investigator needs to collect successfully targeted data on existing personnel resources. This means new forms for your people to fill out. Naturally, HR needs to be able to "share together something solid and dirty" to do the data processing and is told so. "Just Wednesday will do fine, thank you."

Now, at this point, some managers

gets collected, and then the project runs out of steam. By then, it's late; the data collection goes on, the forms are filled out, and the report is finally printed long after anyone has use for the information.

It is generally agreed that time has to be traded so that there is some way of making change backs and signing a book for extending new jobs. You probably have some fairly simple and straightforward way of

doing that now. The problem is when somebody proposes that you find you, say, the ratio of junior to senior analyst time spent on the maintenance of a new system. The information is probably considerable, but you must figure out a way to limit the extra paperwork ahead of time, or you'll have a rebellion on your hands.

Some ideas on how to do this follow: Ask why. Will finding out that ratio help? If that number is the answer, what was the question? The bottom line is really whether this project is going to help you manage better and help your people work more productively. If it doesn't help, it's just academic information, no matter how interesting it might be.

Check your investigator's math. "Doubtless" is a peculiar disease common to all those who dabble in statistics. Its course goes something like this — if it is good knowing how a number spends his time by the day, by the hour in better and by the half hour is better still.

There's an illusion of accuracy in extended decimal places, but it's only on illusion. Take a look at how the statistic works. In theory a half-hour resolution in anybody's workday? Do the units really mean anything?

Cole is a senior associate with Nicholas DeBelle Associates in Bryn Mawr, Pa.

See COMPTON page 48

VIEWPOINT



LETTERS

Token-bus not omitted

I am writing to point out a major inaccuracy in the Special Report "Communications Networks" edition (CW, Feb. 26). The article "Standards key to continued network development" stated that prod-

ucts implementing the IEEE 802.4 token-bus technology probably will not be available until 1985.

In point of fact, Concord Data Systems, Inc. introduced its Token/Net local-area network in March 1983. Token/Net was the industry's first local-area network to comply fully with the IEEE 802.4 broadband token-bus standard. Concord Data Systems actively participated in drafting the IEEE 802.4 standard and currently

chairs the IEEE 802.4 committee.

Token/Net was selected as the IEEE 802.4 network to link equipment from Allen-Bradley Co., Digital Equipment Corp., Gould, Inc., Hewlett-Packard Co., IBM and Motorola, Inc. in General Motors Corp.'s Manufacturing Automation Protocol multi-vendor network demonstration at last year's National Computer Conference.

In terms of product availability, Concord Data Sys-

tems is currently supplying Token/Net components on an ODM basis to Patton Telecommunications B.V. of the Netherlands for its Sepho-Net local-area network and to Allen-Bradley for its Visant local-area network, and the firm has signed an agreement in principle to supply Texas Instruments, Inc. with Token/Net equipment for its TNet II local-area network.

To date, more than 400 Token/Net components have been installed, and the sys-

tem is under evaluation at 50 additional sites for both manufacturing and office communications applications.

Companies such as Ungermann-Bass, Inc., General Electric Co., IBM/Interactive Systems, Motorola and others have also announced plans to develop IEEE 802.4 networking products, some of which may indeed be on the market prior to 1985.

It is difficult to believe that Bridge Communications, Inc., a local-area network vendor itself, is unaware of the availability of IEEE 802.4-compatible products. It is this kind of erroneous and contradictory information that adds much confusion to a market that is understandably difficult for most people to grasp.

APR Hahn
Watson, Mass.

CURBLE cont. page 42

Is there a good reason why everybody has to fill out this form? Even your seminar will have to admit that the time spent by your people tracking time and filling out the form is pure overhead, not to mention aggravation. This aggravation comes in part from the time your HR personnel spend filling out the form and also from their feeling of personally being measured.

If the real goal is some composite picture of the department, then you can still collect the data, preserve anonymity and simultaneously cut overhead by retaining the day. If the study is on junior and senior employees, have the people in your department draw straws in the morning so that the person with the short straw fills out the form for that day. There will be less but more reliable data collected because people tend to cooperate with a system they consider purposeful and fair.

Try a zero-based forms budget. At some regular interval, say quarterly, pick up all the forms for all these studies and then eliminate their perpetrators will have to justify them all over again if the study is to continue. If the response is not as good or better than it was the last time, that requested study will stay out of the list. Nothing is immune, and no form is sacred. Institute them off, right down to your humble weekly time sheets. (Sure, this will aggravate the investigators, but why should they have all the fun?)

Keep your own sense of perspective. Recent seminar attendees came back to their senses in time, and they are often better at their work because of the experience. It could be worse. You could have to deal with a newly minted recipient of a master's degree in business administration.

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SOFTWARE & SERVICES



Awards salute mart's vitality

If you think it is impossible for an adult to beam like a child on Christmas morning, then you probably did not attend the recent International Computer Programs, Inc. (ICP) Million Dollar Awards & Banquet Conference in Scottsdale, Ariz.

Outside the presentation hall at the posh Marriott Mountain Shadows resort, a small band of men and women milled about anxiously, talking animatedly and exchanging enthusiastic backslaps and handshakes. Many in the group had donned tuxedos, and more than a few self-congratulatory toasts were raised as the

See ICP page 52

Lisp defends AI foothold despite Prolog challenge

By Glenn Feldman
CI Staff

Although the vast majority of artificial intelligence programming is done in the Lisp language, a challenger has appeared in the form of Prolog. Prolog (for programming in logic) was developed in France and England in the 1970s but did not gain much attention until the Japanese chose it as the official language for their fifth-generation push.

Although both are symbolic logic languages — as opposed to numeric languages like Fortran and Cobol — a debate rages over the relative advantages of Lisp vs. Prolog. Lisp, a 71-year-old language, has held its position as the language of choice for AI in the U.S. since it was created. Because it consumes so much memory, it never became popular outside the AI community where more hardware-economical languages such as Fortran were available.

Despite that, Lisp has developed such an immense following in U.S. AI community that industry analysts wonder if anything can replace it. Dedicated Lisp machines are now forming a blossoming market and, combined with its large base, Lisp appears to be a safe choice for AI programs. Edward Polgarnov, an

AI researcher at Stanford University, said, "Collectively, we have so much more experience with Lisp and symbolic manipulations using Lisp that the safest bet is still to pursue Lisp developments."

In fact, Lisp has spawned such a large number of versions, including Xerox Corp.'s later Lisp, Symbolics, Inc.'s ZetaLisp, MIT's MacLisp and others, that the AI community is currently attempting to agree on a standard version dubbed Common Lisp. Patrick H. Winston, director of MIT's AI Laboratory, said the creation of

See LISP page 54

ANALYSIS

SOFTWARE/GRESH PARK

Upkeep: The ongoing bug

To any programmers dislike software maintenance is an understatement. The fact is, just about every programmer hates maintenance. But maintenance currently accounts for more than half the work load of most programmers. That being the case, maintenance should be performed well and with a positive attitude.

But most programmers are not formally trained in software maintenance. With the right education and training in software maintenance, many problems could be solved. With higher maintenance programming pro-

ductivity, the 55% of programmer time spent on maintenance could be reduced, and huge savings in maintenance could result. Programmers could then devote more time to reducing development backlogs.

"Maintenance may be shaping up to be the major programming problem of the rest of this century," warned the article "Keeping maintenance minimal" (CW, Feb. 4). The problem has been in the making for several years.

Software maintenance is defined as any work done on existing software. Maintenance includes correction of errors and omissions carried over from development, the addition of new features and any adaptations to changing hardware and operating environments. While maintain-

See MAINTEN page 54

Parish is a Chicago-based independent consultant, lecturer and author. He is a prior contributor to Computerworld.

Tandem enhances Guardian system

CUPERTINO, Calif. — Tandem Computers, Inc. has introduced an enhanced release of its Guardian operating system that is said to improve significantly on-line transaction processing performance.

According to a spokesman, Guardian 90 is fully compatible with previous releases of the Guardian multiprocessor, network-oriented operating system, which supports the Nonstop architecture of all Tandem computer systems. All applications compatible with prior releases of Guardian can be run with Guardian 90.

The spokesman said initial customer tests and company benchmarks have indicated performance increases between 50% and 70% for on-line transaction processing applications using Tandem's transaction monitoring facility. Guardian 90 also allows greater flexibility to run larger applications by increasing user code and library space up to 4M bytes — 32 times the amount in previous releases, the spokesman said.

Guardian 90 is said to feature a high-performance disk process that serves as the foundation of all disk record and file management activities. The process reportedly improves performance for batch applications, I/O-intensive on-line processing and system utilities programs. The disk process is compatible with all Tandem disk drives and

See GUARDIAN page 48



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Spotlight

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SOFTWARE & SERVICES

Ask applications debut for HP 3000, DEC VAX systems

LOS ALTOS, Calif. — Ask Computer Systems, Inc. has announced five manufacturing application products designed to run on Hewlett-Packard Co. HP 3000 machines and a micro host product for HP and Digital Equipment Corp. VAX machines. Ask also announced that three of its business applications packages are

available for the VAX.

A decision support system, Decisionmaker, can be integrated with Ask's Manufacturing Management (Manman) Information System and allows users to access summarized information from manufacturing, marketing and financial programs. Decisionmaker includes an exception reporting feature

that lets users monitor specific elements of the business, such as inventory value. The product is menu and command driven.

Decisionmaker is priced from \$8,100 to \$16,000, depending on hardware configuration. Shipments begin July 1.

Manman/Repetitive is a manufacturing scheduling

application for companies with high production volumes and short lead times. It can be used with Ask's Manman/MPG manufacturing package and is said to eliminate the need to enter work or flow orders. The product generates a production report for continually manufactured parts. Planned production can be stated for

specific days of the week or automatically distributed over all manufacturing days.

Manman/Repetitive includes pull system capabilities for moving inventory from stock to the shop floor, a build schedule and a backflush feature that allows users to update inventory balances and record material expenses through a single transaction. The product is priced from \$20,250 to \$37,500, depending on configuration.

Project planning system

Ask also introduced a project planning and costing system for the HP 3000 series. Manman/Projects will interface with Ask's Manman/MPG, Manman/AP and Manman/OL modules, allowing users to record project costs as they occur.

Material commitments and receipts, labor, material and labor burden and general expenses and adjustments are posted into the Manman/Projects data base, allowing the user to see costs and man-hours expended on a project. The product is priced from \$13,500 to \$26,000 and will be available July 1.

Ask's quality management software is said to monitor the quality of parts and products. Manman/Quality collects test and inspection results, analyzes the data and provides reports to management.

The product allows users to design data collection prompts and includes capabilities for producing frequency tables, control charts and histograms, the vendor said. Users can create tabular reports based on user-defined prompts. Manman/Quality is priced from \$33,750 to \$62,000 for the HP 3000 and will be available August 30.

Human resource package

Also announced was a human resource package that gives users access to job description, salary and employment information. Manman/RH can be integrated with Ask's Manman/Payroll package and can be run as a stand-alone product or in conjunction with Ask's Manman/Information System.

The human resource package includes capabilities for producing alien and affirmative action standard reports, according to Ask. The product is available immediately and is priced from \$11,475 to \$21,250, depending on system configuration.

Ask also announced Planman/MPG, said to allow a manager to extract information from the Manman/MPG application on the HP mini-computer or DEC VAX for manipulation on microcom-

See ASR page 40

Goal Systems

Getting spreadsheets, word processing, graphics, communications and the IBM PC to work together can be tough, too.

If you think solving the federal budget deficit poses a challenge, you haven't tried getting a company's personal computers under control.

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SOFTWARE & SERVICES

Westinghouse E-mail debuts

PITTSBURGH — Westinghouse Electric Corp. has announced Maltroic, an electronic mail system that runs as an application under the Westinghouse West teleprocessing monitor or as a task under IBM's CICS.

According to a vendor spokesman, Maltroic may be used to generate memos or to create documents for detailed proposals and reports.

Maltroic messages are formatted automatically with little user interaction. Security is maintained

through a personal password system, the vendor said.

Versions are available for IBM's DOS/VSE or OS/MVS operating systems. Files are maintained through IBM's VSAM.

The perpetual license fee for Maltroic is \$9,000 for DOS systems and \$16,000 for MVS systems.

Westinghouse Electric's Management Systems Software Division is located at 777 Penn Center Blvd., Pittsburgh, Pa. 15236.

ASK from page 45

puters that run Microsoft Corp.'s MS-DOS or IBM's PC-DOS operating system and updated that information back into the Manman application.

Planman/MFG reportedly includes capabilities for conducting "what-if" analyses. The system downloads the forecast and demand information to a micro and then loads it onto a pre-defined spreadsheet from which the analysis can be performed. The product is priced from \$2,530 to \$4,135 and will be available July 1.

Three Ask products, Manman/Service, Manman/Payroll and Manman/Fixed Assets (FA) are now available on the DEC VAX in addition to the RP 3000 series. Manman/Service is a field service management product that can analyze equipment failure and response time, track and dispatch service calls and man-

tain customer information, equipment, contracts and warranty information, the vendor said. Manman/Service is priced from \$27,000 to \$60,000, depending on configuration.

Manman/Payroll is a user-defined system that can handle large payrolls for companies with multiple divisions, the vendor said. The system includes tax tables for federal, state supplemental and local tax formulas. It is priced from \$16,200 to \$30,000 depending on configuration.

The Manman/FA is a menu-driven system that allows users to enter items with book, tax and user-defined depreciation schedules. It groups the items by user-defined asset class codes. The package costs from \$8,775 to \$16,500, depending on system.

Ask Computer Systems is located at 730 Distel Drive, Los Altos, Calif. 94022.

GUARDIAN from page 46

with the Tandem 3106 and 3107 controllers.

In addition, Guardian 90 also is said to offer an automatic rollback feature, which was described as an automated recovery feature that allows Tandem systems to recover more quickly from multiple component failures.

Bundled products

Tandem also announced that Guardian 90 will be offered with three other software products as a package called Guardian 90XF. The products are Encompass, a distributed data base management system; Expand, a system for transparent networking; and Transfer, a general-purpose information delivery system.

The product package is targeted at users building high-volume applications and distributed networks, the spokesman said.

Guardian 90 will be provided at no cost to existing Nonstop II, Nonstop TXP and Nonstop EXT users.

For new Nonstop II and Nonstop TXP customers, the initial license fee will be \$5,500 per processor. On the same machines, the initial license fee for Guardian 90XF will be \$11,000 per processor.

The spokesman said there is no initial license fee for new Nonstop EXT users. Monthly license fees of \$200 per system for Guardian 90 and \$600 for Guardian 90XF will be charged. Guardian 90 and 90XF will be available in July.

Tandem Computers is located at 10833 Vallecito Pkwy., Cupertino, Calif. 95014.

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SOFTWARE & SERVICES

ICP from page 45

were relaid as the fiery sun crept behind the craggy mountains jutting into the purple-orange Arizona sky.

The affair had the atmosphere of a graduation ceremony — and in a way, that is exactly what it was. The men and women in that group were representing software companies that had stepped up to a new plateau, that had achieved an honor less than 1% of all software

companies have ever earned. The software companies were graduating to ICP's exclusive Million Dollar Club.

On that first night of the ICP gala, some of the best and brightest of the software world were waiting for ICP President Larry Welles to hand out the coveted One Million Dollar and Million-In-One awards. ICP's One Million Dollar award is presented to software packages that have achieved \$1 million in aggregate sales. The Million-

In-One award honors packages that reached that sales plateau in their first year on the market.

As the economy goes, things have changed in large measure since ICP first began honoring products in 1973. But the million-dollar mark is still a formidable hurdle, and the award has not been diminished by time. Thus as each product was called from ICP's honor roll, the company representative was buoyed during the wait

to the podium by whistles and cheers from colleagues and polite applause from others in the audience.

Some of the companies represented that night were old hands at the ICP awards. For example, Cincos Systems, Inc., which receives Million-In-One awards for its Net/Master and Master products, holds the highest honor ever awarded by ICP — a \$250 Million award for its Total data base management system. Management

Science America, Inc., which garnered a One Million Dollar award and two Million-In-One awards, grabbed an unprecedented third \$100 Million award the next day.

But prior awards did not take the shine off the awards, even for the multi-million dollar software companies in attendance. A One Million Dollar award may represent only one milestone in a healthy, multiyear income stream. According to Welles, 60% of the products that have been honored by ICP since 1973 are still being sold by their vendors.

But the ICP event has significance beyond the awards themselves. Much of the trade and general business press lately has focused on the so-called downturn in the computer industry. The industry talk these days is of layoffs and forced vacations, factory shutdowns and inventory cutbacks, bidding frenzies and profit slips, stock tumbles and Chapter 11 ceases.

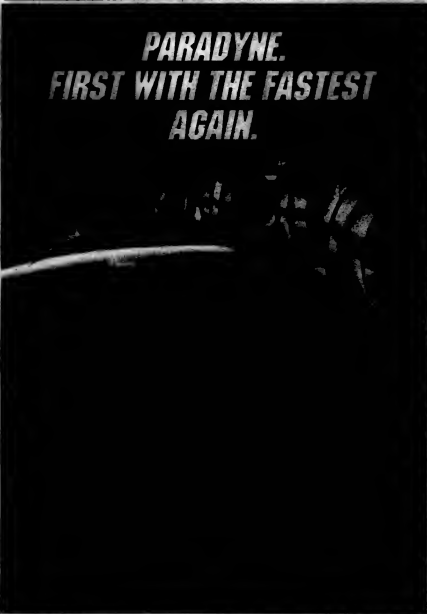
Yet IBM has not been immune to the malcontents in the marketplace, and some other players, like the mini-computer manufacturers, have been particularly hard hit by whatever adverse forces are at work.

Systems software remained

For now at least, the large systems software industry — micro software is something of another story — has remained relatively unscathed by the shift in the fortunes of the computer industry as a whole. Whether that reflects the growing importance of software as compared with hardware or whether software is simply a trading segment of the market that will take it on the chin later remains to be seen. For today, the software industry in general has good reason to beam.

Some people, perhaps rightfully, criticize the ICP awards as self-serving. But the event remains something of a testament to the vitality of the software industry, which has achieved a great deal since the days software came bundled with the number-crunching box. Those software products that meet the real needs of users have been successful, some of them perhaps far more successful than their inventors could have imagined. That trend, one can only hope, will continue.

As long as the trend does continue there will be vitality in the software industry. That is a message Welles tried to impart in his keynote address, and it is one that software vendors would do well to heed. If enough vendors heed it, the software industry may emerge intact from the economic storm and the ranks of the Million Dollar Club will continue to swell.



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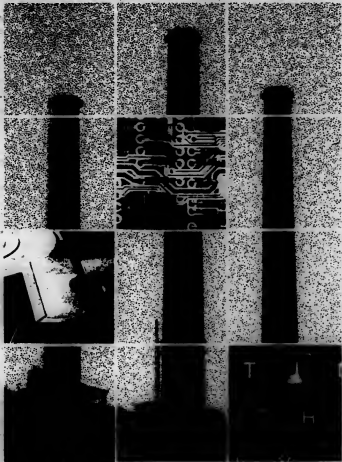
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Special Report

Computerworld
May 27, 1985

Manufacturing Systems

An industry update



Inside:

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Special Report

Alliance builds behind GM's MAP

By Edward Werner

When 400 people, representing 300 companies, show up for the users group meeting of a product that does not yet exist, the product must be important.

That is exactly what happened late last month at the Dallas meeting of the Manufacturing Automation Protocol (MAP) Users Group. The group is comprised of representatives of the user firms that want to take advantage of this protocol currently under development by General Motors Corp.

When it is complete, MAP will give GM and those manufacturers that follow the automaker's lead a means to attain the long-sought goal of linking islands of automation, isolated work cells within a factory. Those islands communicate within themselves, but they rarely can communicate with other islands, let alone the corporate mainframe or the minicomputers equipped with computer-aided design systems.

MAP would change all that. A token-bus, broadband local-area network based on the IEEE 802.4 standard. MAP will provide communications between the equipment of all of the factory automation vendors that support it. It will provide that communication from the computerized numerical controller on the shop floor — a microprocessor controlling, say, a drill press — up to the mainframes at the corporate headquarters, even if the headquarters is hundreds of miles away.

GM, which is establishing MAP with input from those who hope to be future users, said that it will implement MAP in a section of at least one of its plants this year. The automaker has put the technical details about MAP in the public domain and has distributed 3,000 copies of the preliminary specifications so far.

To ensure that its vendors know, the automaker has said it will buy nothing other than MAP-compatible factory automation equipment once MAP is fully developed in 1988 or 1989.

Mindful of that message and the continuing growth in the MAP Users Group, more and more factory automation vendors are casting their lot with MAP. Most recently, Intel Corp. announced joint agreements with Westinghouse Electric Corp. and with Industrial Networking, Inc. — a joint venture between General Electric Co. and Ungermann-Bass, Inc. — under which MAP-based products will reportedly be developed. Those agreements came at the MAP Users Group conference, along with an announcement by Tandem Computers, Inc. that it would support MAP's specifications.

A mark of MAP's increasing vendor support may be seen in the difference in the sheer number of vendors cosponsoring the MAP demonstration at last year's National Computer Conference (NCC) and the number that GM said will be present when a full-fledged version of MAP is demonstrated at this year's Autofact '85 show in Detroit Nov. 4 to 7. Seven factory automation vendors, ranging from Allen-Bradley Co. at the computerized numerical controller level

all the way up to IBM, were with GM at its booth when it debuted MAP at NCC '84. According to Steve Dillon, vice-chairman of the MAP Task Force, formerly GM's internal broadband users' group that is spearheading the standard's development, 17 vendors will be involved with GM's MAP display at Autofact '85 — and 10 more had to be turned away because of limited space.

The Autofact '85 demonstration will be a complex one and perhaps a watershed for MAP, a standard based on the seven-layer International Standards Organization's (ISO) Open Systems Interconnect model. According to Dillon, a GM senior staff research engineer, the booth will feature two subnetworks.

One will be sponsored by Boeing Computer Services Co. and based on the IEEE 802.3 baseband standard most often seen in office local-area networks. The second subnet, GM's, will be MAP based. Communication will take place within the subnets, between the subnets — via gateways — and between the GM subnet and the GM Technical Center in Warren, Mich., nearly 16 miles away.

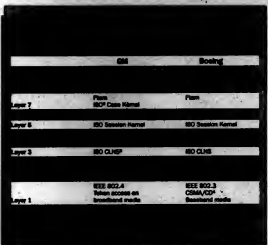
Though only Levels 1, 2 and 4 of that model were implemented at NCC '84, the MAP demo at Autofact '85 will feature data transfer at all levels but the sixth. Layer 6 of the ISO model, the presentation layer, posed a problem for the MAP Task Force because the international standards within which MAP seeks compatibility

a lot of good ideas there, but who are you going to get to implement [them]?" By working with the input of the ISO and the companies in the MAP Users Group, Dillon said that MAP becomes the factory automation protocol that "meets everyone's needs."

One of the firms that will implement MAP in several of its new and existing plants — as early as next year — is Eastman Kodak Co. Kodak is one of the nine member companies on the steering committee of the MAP Users Group. According to Charles Gardner, coordinator of MAP development at Kodak, his firm is excited about MAP because it implements the ISO's Internet standard, making possible communication with much office local-area networks as Ethernet. "We don't want a different set of standards within the office and the factory," he pointed out.

As the technical barriers fall and company-wide communication becomes, at last, a hope for many manufacturers, at least one analyst wonders if a major question has still been left unanswered.

In the view of Peter A. Cohen, research manager of Framingham, Mass.-based International Data Corp.'s Computer-Integrated Manufacturing Service, MAP's spread of communication will mean "the guy who controls one area has to yield some authority to the guy who runs another area." Those personal fiefdoms will not topple easily, accord-



have not yet been fully spelled out by the ISO. Dillon acknowledged that GM had at one time considered going it alone with its own standards for Layer 6. The automaker had learned from experience, though, that standards are best when they are widely supported.

There was a time, he said, when GM would "go to a vendor and start talking about what we need at this [communications protocol] layer, what we need at that layer, and the fellow would at first, listen to us for an hour and then say, 'Hey, you have

ing to Cohen.

The world will get a glimpse of MAP's meaning for the factory of the future this fall when GM begins production in a revamped section of its Saginaw, Mich., Steering Gear plant. Production in a section of that plant, comprising 5% of the shop floor, will be done by machines from a variety of vendors supporting MAP. The production will be monitored from the sidelines, and workers in that section will stand to the side as parts are made, stepping forward only to set up or maintain the machines.

Special Report

What became of the projected robotics market boom?

U.S. robotics market projected growth '82-'89

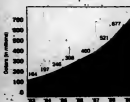


Figure 1.

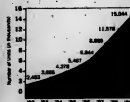


Figure 2.

* These figures only refer to revenue from sales of robots, not from additional equipment and services. Source: "Robot Sales" survey by International Data Corp.

By Peter A. Cohen
Special to CW

The blunk is off the robot race, and many vendors and investors who reached in too hastily have been perched by the shore.

With a handful of exceptions, vendors are posting losses. A number of companies that enthusiastically entered the market five years ago have quietly slid out the back door, and once-ogre venture capitalists now turn a deaf ear to entrepreneurs.

What happened? Why haven't robots by the thousands taken over the factory floor? Why aren't projections of a \$2 billion market by 1990 panning out? Why haven't vendors realized fat profits and entrepreneurs instant riches?

According to International Data Corp. (IDC), a market research firm based in Framingham, Mass., revenues in the U.S. robotics market are projected to grow at 20% to 30% annually through 1989, reaching \$677 million that year (Figure 1). In terms of units purchased annually, the market is projected to grow from 3,665 in 1983 to more than 15,000 in 1989 (Figure 2), with the installed base of robots increasing to more than 62,000 by that year.

The following three general factors explain these lower than expected numbers:

■ A long implementation cycle based on end users' needs for the development of custom-application solutions.

■ Slower than expected growth in automobile industry purchases.

■ Use of other forms of automation, such as material requirements planning and computer-aided design, that will precede the installation of robots.

Implementation cycles. An effective robot installation

demands a highly structured environment tailored to a specific application. Robots cannot be plugged in right out of the box and perform effectively; they are not toasters. Those robots that are purchased with management's expectation that they can simply be plugged in and go to work may end up occupying visitors in the lobby or collecting dust in the corporate boardroom, but they are unlikely to be involved in the manufacturing process.

Developing application-specific robotic solutions is an engineering-intensive, difficult and time-consuming process, a fact that early market projections did not take into account. The market for "out-of-the-box" robots is limited to heavy users with large in-house engineering staffs, such as those in the automobile industry. For less experienced users, a robot not fitted to a particular application has little use beyond its first few weeks' novelty value.

Recognizing this fact, most large robot vendors have committed themselves to providing total robotic systems — designed to solve particular manufacturing problems — rather than just selling stand-alone robots. This effort, though difficult, will be critical for vendors that hope to develop markets outside of the auto industry; it will contribute to the long-term growth of the market.

Automobile industry. A second factor that contributed to unrealistic projections of market growth is vendors' and analysts' exaggerated expectations of the automobile industry's needs. A realistic assessment indicates that while the auto companies have been leading purchasers of robots over the last several years, their consumption will level off.

In absolute terms, automakers' purchases will grow slowly from now through 1989. Relative to those in other manufacturing industries, automakers' purchases will decline steadily from approximately 60% of the total market in 1983 to 30% by 1989. By that time, most of the approximately 300 automobility plants in the U.S. will have installed robots wherever possible.

See ENR/76 SR/5

Cohen is a senior analyst for International Data Corp.'s (IDC) Computer-Integrated Manufacturing Service. IDC is a Framingham, Mass.-based market research firm.

IBM strives to extend MIS foothold to factory operations

By Brian Jeffery
Special to CW

When it comes to IBM's strategies, one point is certain: The company wants the manufacturing market. For IBM, the factory is merely part of the broader corporate environment; to integrate factory operations with administrative DP just extends IBM's leverage from the MIS department to the factory floor.

IBM is scarcely a newcomer to the factory, although its performance there has varied. In the computer-aided design and manufacturing systems market, IBM has done very well, providing Computerization Corp. in 1984 as the largest player in this marketplace and posting more than \$750 million in revenue.

In robotics, IBM has been less successful. Despite heavy internal demand and a two-year-old reseller program, the company remains a minor vendor.

As for the rest of the market, IBM maintains an indirect presence in the factory through its host-based applications for manufacturing and stock control and a marginal factory floor presence with the Series/1 mini and a handful of other products and with the year-old 6531, a rugged version of the Personal Computer XT originally developed for General Motors Corp. for factory use.

IBM's current problem is making these pieces fit together. It is partly a problem with establishing technical links among the various IBM systems and partly a problem of market leverage. The company traditionally has had a presence among the administrative DP functions of manufacturers and has recently added turnkey CAD/CAM systems, but IBM's presence normally stops dead at the factory gate.

Apart from the Series/1, IBM equipment has simply not been a serious contender in the market. Companies such as Digital Equipment Corp., Hewlett-Packard Co., Prime Computer, Inc. and specialist vendors of material control equipment have taken the lion's share of the market.

To address this situation, IBM formed the Boca Raton, Fla.-based Industrial Systems Organization in late 1983, grouping its CAD/CAM, robotics and other industrial operations. Industrial Systems has proven to be one of the more flexible IBM units. Because IBM has little

presence in the factory, Industrial Systems encourages third-party cooperative arrangements with vendors well established in the market.

Industrial Systems has participated in a number of major end-user programs, notably the GM Manufacturing Automation Protocol (MAP) program and a joint CAD/CAM development effort with Grumman Aerospace Corp.

The IBM unit has also worked with vendors such as Allen-Bradley Co. and Modicon in implementing Series/1 support for their programmable controller systems and with Cincinnati Milacron, Inc. for 6531-based

See ENR/76 SR/5



Jeffery is director of research at International Technology Group, Inc., a Palo Alto, Calif.-based market research firm.

Special Report

Robotics mart still growing

Although the robotics market is not likely to live up to earlier expectations, unmitigated pessimism is unwarranted. The current conservative market projections show a healthy growth rate.

Robots will increasingly find their way to the factory floor, aided by a number of encouraging factors:

- Increased technical capability. Improvements in robotic systems capabilities over the last few years have enhanced robot applications potential, and this trend is likely to continue.

- Developments in end-effectors, or mechanical digits, for example, have clearly expanded the use of robots in

electronic assembly operations, and the development of through-the-torch sensing has improved arc-welding capability. As greater intelligence is provided and visual feedback is perfected, the opportunity for robots in assembly operations will be greatly expanded.

Off-line programming and the ability to link robotics to computer-aided design systems will also encourage market growth.

- The growth of robot systems engineering houses. These firms will cater to manufacturers without engineering staffs. They will provide turnkey solutions for a manufacturer's particular robotics needs.

- Users rethinking the robotics justification process. The technique of justifying robots on the basis of direct labor's wage savings is yielding to a broader assessment of savings from higher quality production and less rework, less waste, fewer accidents, increased flexibility and market responsiveness.

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Robot suppliers divide into tiers

The growing understanding that robots must be integrated into manufacturing systems is having the effect of sorting vendors into two tiers.

The first tier, "out-of-the-box" vendors, includes vendors that are unable or unwilling to design and assemble robotic systems; this group will sell only robots, that is, arms and controllers. The second tier, systems vendors, includes vendors that sell robotic systems designed for specific applications.

Out-of-the-box vendors. Vendors on the first tier will sell primarily to systems engineering houses, to second-tier vendors that need to supplement their lines for particular applications and to those few users that have engineering staffs large enough to do their own installations.

All first-tier vendors must provide some level of support, but competition among them will rest on pricing.

Robots with similar performance capabilities are already priced very closely. Given this environment, low-cost producers are the most likely to prosper. For most types of robots, this gives Japanese vendors who enjoy the benefits of high volume and economies of scale, a big advantage.

Systems vendors. The second tier of vendors, those that provide specific applications solutions, must have ample resources and the commitment to developing these solutions. To do this effectively, vendors need a sound understanding not only of robots but also of other manufacturing machinery. Moreover, they will need to acquire some knowledge of each user's entire production process.

Most of the leading robot vendors have committed themselves to participating in this second tier. In this market, competition will occur less on the basis of price than on the basis of each vendor's ability to commit all necessary resources to provide effective solutions to specific manufacturing applications.

Special Report

IBM Item B1/3

numerical control applications.

IBM obviously believes that it has to play ball in the factory arena if it is going to establish a realistic presence. It recently cooperated with the National Bureau of Standards (NBS) as part of a larger factory standards effort coordinated by NBS. IBM's support for standards, though, is "nearly without self-interest. In particular, IBM would like several of its own environments incorporated into the overall standards picture. These are principally the following:

- **Copics**, a material requirements planning system supported by IBM on host mainframes and the 4300.

- **A Manufacturing Language (AML)**, an internally developed robotics control language used by IBM for its line of 7500 series robots.

- **The 4300 series**. IBM has been promoting the 4300 series for engineering applications since 1981 and recently has targeted its 4301 at this marketplace. The 4300 series-based systems constitute the vast majority of IBM's turnkey CAD/CAM business, and IBM would like the line to be part of the general factory standards scene.

- **IBM CAD/CAM software**. At present, IBM markets a line of third-party products, including Lockheed Corp.'s Cadam, Structural Dynamics Research Corp.'s Cads, Dassault's Catia and Bell Northern Research's CBDS. The dearth of good IBM-compatible CAD/CAM software has led IBM to fund development projects to the tune of \$50 million at more than 30 U.S. academic institutions.

- **The 5080 Graphics Display System**, a line of intelligent Motorola, Inc. 68000-based CAD workstations supplied to IBM by Sanders Associates, Inc. and compatible with the IBM 3260 line.

- **The 5631 Industrial Computer**, a rugged version of the Personal Computer XT.

- **The Industrial Network**, the IBM version of the broadband token-ring local-area network developed under the GM MAP program.

The IBM game plan focuses on integration of these products with products from factory vendors who are already well established, notably programmable control vendors such as Allen-Bradley and Modicon and numerical control machine tool vendors such as Cincinnati Milacron. For specific end-user factory automation projects such as MAP, IBM is also prepared to support DEC, HP and Prime machines.

Future developments

Once its own equipment is embedded in the overall standards picture, IBM is likely to do the following:

- **Develop a range of offerings for specific applications**, including the 4300 series (CAD/CAM, central factory control applications); 7500 series robots tied to the latter via VMLink, a CAD workstation based on the Personal Computer line; a desktop version of the 4300 series and a stand-alone version of the 5080; the Industrial Network local-area net; and the 5631.

- **With computer-integrated manufacturing**, aimed at large system end users, IBM may integrate the various IBM product lines first under a 4300 series-based factory communications umbrella and then with key IBM host products such as Copics.

ROBOTS Item B1/3

ble, and new purchases will largely be for replacement.

Other forms of automation. A manager looking to automate his firm's manufacturing facilities should not begin by asking, "How many robots should I buy?" In most cases, installing robots and bringing up other factory floor equipment should be among the last steps in a long-term process.

The critical ingredient in an effort to improve manufacturing efficiency is a commitment to enhancing management's knowledge and control over an organization's entire manufacturing process.

Managers must discover exactly what occurs on the factory floor through effective, computer-con-

trolled monitoring and reporting.

Once managers know what is going on, they can take steps to organize the whole system better. Only when they have an overall plan in place should they begin to consider automating specific factory floor operations with robots or other equipment.

Learning from history

The history of computerizing data processing is instructive. Many firms that hoped to improve their poorly organized accounting systems by installing computers quickly found themselves possessing poorly organized computerized accounting systems.

Some robot installations have suffered from similar experiences. A robot may be doing a sensationally fast

and accurate job at its particular station, but if a firm's production process is insufficiently organized, bottlenecks will be developing in front of and behind the robot operation.

When this happens, management will not realize overall productivity gains.

The effective installation of robots should, in many instances, follow the implementation of manufacturing resource planning systems and the installation of devices that enhance control and communications throughout the factory.

During the next several years, the market for that kind of equipment and those systems will remain much larger than the market for robotics.

The full value of robotics systems will not be realized until other manufacturing systems are in place.

Knowledge of manufacturing nets, emerging standards

By Lee Hiding
Special to CWI

Understanding network management and being aware of emerging network standards is important as factory networks move closer to broad industry implementation.

Network management is composed of network planning, installation, operation, maintenance and modification. All networks have these functions in common. Manufacturing networks, however, have additional special requirements.

In particular, manufacturing networks must operate in relatively hostile industrial environments. Networks of this nature must boast extremely high availability because of the large per-minute costs of idle equipment and workers. These factors point to the strong need for fault management.

Backbone local-area net

Most factory networks will consist of a backbone token-bus, broadband, local-area network (IEEE 802.4), which will support communications between work-area networks (including manufacturing floor cells) as well as communications between the work areas and an overall factory control computer.

In some cases, manufacturing cells will consist of a single node attached to the backbone local-area network, and in other cases, the cell or administrative work area will contain its own network—for example, Ethernet, Allen-Bradley's Data Highway, Gould, Inc.'s Modbus and so on.

In the case of a cell with its own internal local-area network, there will be some intelligence (a programmable controller) between the cell's network and the factory's backbone local network. From a network perspective, the cell's internal local-area network is not visible, and each cell appears as a single node on the backbone.

In the case of an administrative work-area local network, there will be a gateway to the backbone net, and the network management system will be able to control at least the gateway and possibly the entire work-area subnetwork. Alternatively, the work-area subnetwork may have its own local-area

network management.

In the factory, the demand for high availability will mandate reduction of single points of failure and rapid isolation of faults in those cases where redundancy is prohibitively expensive or technically infeasible.

Management of factory local-area networks is made

possible by embedding a management agent in each node attached to the network. The agent gathers statistics about the performance and use of the node's network interface and can run tests or access network control data in the node on behalf of the network manager. The network manager is a

collection of applications software that performs the universal network management functions of configuration management, fault management and performance management.

The network manager will typically be implemented on a supermicro or minicomputer attached to the backbone

local-area network and will provide a data base of the network configuration, performance statistics and a log of alarms and other significant events that occur in the network.

The factory network specified by the General Motors Corp.-sponsored Manufacturing Automation Protocol

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Krieg is a development manager for local-area network management products at Codex Corp., a subsidiary of Motorola, Inc.'s Information Systems Group based in Mansfield, Mass. Codex is a manufacturer of integrated data communications systems and networks.

Special Report

and network management critical to factory managers

(MAP) project is based on the International Standards Organization Open Systems Interconnection (ISO/OSI) reference model (Layers 2 through 7) and the IEEE 802.4 and IEEE 802.3 standards (lower two layers).

Each of these layers has a specialized management function, which may be im-

plemented by vendors in any way they choose.

The agent that provides a single, standardized management interface to the node will be an application program that uses implementation-specific means to access the layer management functions. The agent will then communicate with the net-

work manager via a standardized system management protocol.

In this way, any vendor of a node is free to choose the implementation that is appropriate for their interface internal to its products, while still allowing all nodes in the factory to be managed in the manner required for

consistent operation in the industrial environment.

Set of protocols

Of course, these vendors should not be overly burdened by network management standards. To avoid this, a fairly simple set of system management protocols is being developed con-

currently by several standards groups.

These protocols recognize three basic modes of interaction between the network manager and the nodes on the network.

The first mode of interaction is a command and response interaction during which the network manager asks the agent to perform an action such as reading or writing a parameter or counter value or initiating a test or restart of the node.

The second mode is provided to allow the agent to send unsolicited notifications of significant events (such as an alarm condition appearing or clearing) to the network manager.

The third mode is for downloading of software to a node.

In the case of the first two modes of interaction (command/response and event notification), a system management protocol will be used. This is considered to be an application layer protocol and therefore requires at least a minimal OSI environment in the node.

When a node is first powered up or is reset, there may not be enough intelligence to provide OSI communications. For this reason, the download protocol will be designed for the purpose and will not use OSI communications services.

Standards groups

There are currently three standards groups in the U.S. working on network management. The IEEE 802.1 subcommittee is developing a systems management protocol and a download protocol.

Naturally, the focus of this subgroup is on issues of importance to local-area nets; this implies principal concern with OSI Layer 1 and Layer 2.

The ANSI subcommittee X3T5.4 is developing standards for management of OSI systems. It is therefore developing a structure applicable to all layers.

The MAP project is also addressing all OSI layers. The project will promote a common link between the management of upper layers and lower layers (local-area network protocols).

At this point, there is cause for optimism that OSI system management and IEEE 802.1 local-area network management will emerge as a coordinated set of standards.

For perhaps the first time ever, the consistent management of upper layers and lower layers will be demonstrated in a multivendor environment at this year's MAP demonstrations at Autofact '85 Nov. 4-7 in Detroit.



Companies fine-tune MRP II to improve efficiency, goods

By Bruce Garwood
Special to CWS

Many systems developed over the years for managing the functions required to plan and schedule a manufacturing company have not addressed the basic causes of productivity leaks. The systems simply could not keep up with the constant stream of changes in forecasts, customer orders and bills of material.

To compensate for the absence of a formal system that could coordinate the availability of material, capacity and labor, managers fell back on informal systems of shortage listing, order launching and expediting. Today, however, there is a formal decision support system: manufacturing resource planning (MRP II). The system can help companies bring together all the resources necessary to manufacture and distribute their products in a timely way.

MRP II is a set of computer-supported information tools designed to give managers the information they need to manage cash flow, labor, inventory, distribution and purchasing. It also integrates marketing and engineering plans and provides useful financial information. Significant product quality and customer service improvements are the by-products.

The late Oliver Wight, one of the pioneers in the field of production and inventory control, developed a checklist for measuring the effectiveness of an MRP II system. His ABCD Checklist (Figure 1) consists of 25 statements on technical issues, data integrity, staff education and system use. Companies that use their MRP II systems most efficiently are ranked as Class A users.

Achieving Class A status, however, does not imply that a firm has no room for improvement. It simply means the organization's management is in a position to make the best possible use of the skills at its command.

Garwood is president of R.D. Garwood, Inc., an Atlanta-based company that specializes in MRP II education and consulting. He is also executive vice-president of Oliver Wight Education Association, a Newbury, N.H.-based consortium that offers classes, a video-based library and consulting services for MRP II users.

With the nagging problems of material shortages and capacity overloads under control, managers can take advantage of other technologies that will further improve productivity. Consultant George Bevin, president of George E. Bevin, Inc. in Longboat Key, Fla., said it well. "MRP II is a journey, not a destination." Class A is not the end of the MRP II journey, but simply an important milestone along the road.

The possibilities lying beyond Class A status promise even greater rewards that MRP II alone can provide. Aggressive Class A users keep finding new ways to take advantage of the information their systems provide.

In their efforts to become more competitive, for example, some companies are re-designing their products to reduce the number of different parts needed, while still offering their customers a wide variety of product options. The firms develop new parts that are common to all products, regardless of the options that customers specify.

This reduces the number of items on the planning bill and makes forecasting easier and more accurate. It also results in less inventory, lower costs and better quality because there is greater parts standardization.

Many companies are making great progress in reducing shop floor queues (and thus reducing work-in-process) by using capacity planning systems better. Better management of capacity builds these firms' confidence to operate with smaller

queues on the factory floor.

Some organizations are making further reductions in queues by applying the concept of "group technology" to reorganize the shop into "process" cells. In contrast to the process on conventional shop floors, group technology requires that parts flow from Machine A to Machine B to Machine C

See MRP II/12

ABCD checklist of users' MRP II status

1. Inventory record accuracy 90% or better	_____
2. 80% of material accuracy 90% or better	_____
3. Reorder accuracy 90% or better	_____
4. Initial education of at least 50% of all employees	_____
5. An ongoing education program	_____
6. Two periods for master production scheduling and material requirements planning are weeks or less	_____
7. Master production scheduling and material requirements planning run weekly or more frequently	_____
8. System includes bill of material order and pricing capability	_____
9. Master production schedule visibly managed, not automatic	_____
10. System includes capacity requirements planning	_____
11. System includes daily dispatch list	_____
12. System includes I/O control	_____
13. Shortage list eliminated	_____
14. Vendor delivery performance 90% or better	_____
15. Vendor scheduling done beyond stated lead time	_____
16. Ship delivery performance 90% or better	_____
17. Master schedule performance 90% or better	_____
18. Regular (at least monthly) production planning meetings with the general manager and staff, including manufacturing, production and inventory control, engineering, marketing and finance	_____
19. System used for scheduling as well as ordering	_____
20. Material requirements planning used undisturbed by key people in manufacturing, marketing, engineering, finance and top management	_____
21. Management really uses material requirements planning to manage	_____
22. Engineering changes effectively implemented	_____
23. Simultaneous improvement achieved in at least two of the following areas: inventory, productivity, customer service	_____
24. Operating system used for financial planning	_____
25. Operating system used for financial planning	_____
FINAL SCORE: Score 4 points for each "Yes" answer 90-100 points = Class A 70-90 points = Class B 50-70 points = Class C Under 50 = Class D	

Source: The Oliver Wight Co.

Figure 1. Oliver Wight developed this checklist to help measure the effectiveness of MRP II systems. Class A status indicates that an organization is in a position to make the best possible use of the tools it has.



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Special Report

CIM eludes vendors, but users can grasp it in fragments

By Vance Wilson
Boston to CIM

Contrary to many sales representative claims, computer-integrated manufacturing (CIM) is still a dream; it cannot be purchased from any vendor.

True CIM, an informational model of the manufacturing business that recognizes the role of people and technology in solving business problems, offers far more benefits and is far more complex than any methodology that currently passes as CIM.

CIM is not solely factory automation. It is not simply new hardware and manufacturing software. Nor is CIM the application of fourth-genera-

tion computing technologies to business problems. It should not be confused with manufacturing resource planning or just-in-time resource scheduling.

CIM encompasses artificial intelligence, computer-aided design and manufacturing (CAD/CAM), robotics, data collection, data base administration, computer operating systems, manufacturing resource planning, econometric modeling and more.

No single vendor will ever be able to offer all the elements of CIM because of the broad base of knowledge and technology involved. No one company has the resources or exper-

tise to build CIM products alone.

Three criteria must be met before CIM is transformed from a dream to a reality:

■ There must be cooperation among vendors.

■ Hardware and software technology must be standardized.

■ Software development and information management tools must be improved.

Vendor cooperation. Because no single vendor possesses the knowledge to develop CIM, vendors must cooperate with each other.

Hardware vendors must choose their niche in the CIM market and provide complete solutions within

their chosen market segments.

Hardware and software vendors must cooperate to ensure that the latest hardware development does not prohibit the use of existing applications software.

Ideally, hardware and software vendors should take an open-systems approach so that systems and applications software are compatible with all hardware and all computing hardware is compatible with all other hardware.

Standards. The current state of communications protocols, operation systems and local-area networks causes significant problems, as do different vendors' interpretations of American National Standards Institute (Ansi) standard languages. No one has even developed a relatively consistent approach to the interface of robots, numerical control equipment, data collection devices, CAD/CAM tools and microcomputer links.

Improved tools. The lack of sophisticated software development tools limits the U.S. movement toward CIM. Fourth-generation languages and program development tools are of little value because the major work behind software design takes place at the conceptual design and logical testing stages.

Tools are needed to reduce the effort required to convert a conceptual design into logical and physical data bases. Once that design is completed, there must be a way to test the system automatically. The result of testing is software that conforms perfectly to conceptual design and to physical and logical data bases.

The risk of obsolescence compounds the problem of developing viable CIM systems. The rate of change in hardware and in software—whether it be in operating systems, data base management systems or teleprocessing monitors—jeopardizes the effort required to create CIM.

No vendor can afford to have a massive and expensive undertaking on unstable footing.

Vendors' current responses may be the best answer to coping with this problem. Prudent applications software vendors are isolating their products from system software. Likewise, hardware vendors are creating black boxes and associated software to link incompatible hardware.

In the final analysis, CIM will probably be the information management model for U.S. industry in the future. Significant steps have been made toward the goal, most notably in the independent development of the software and hardware components of CIM.

Although excellent CAD/CAM, computer-aided engineering and manufacturing resource planning systems are currently available, no single vendor has been able to offer a unified solution.

User companies can realize benefits now by implementing independent components of CIM, provided that these come from vendors with an open-systems philosophy.

Wilson is vice president for systems planning at Comserv Corp., an Elgin, Ill.-based supplier of manufacturing software and services.



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Special Report

MRP from S&P

without interruption. This may require an increased capital investment because machines must be dedicated to a process line, but the results are impressive in terms of lead time and work-in-process reductions. Quality is also improved because parts are immediately used, and the feedback on flaws is instant.

A number of Class A users

are just beginning to take advantage of a tremendous opportunity by developing better relationships with suppliers. In many cases, more than 60% of a manufacturing firm's costs and inventory investment and 80% of its cumulative lead time are attributed to the "outside" shop.

Planning production

By communicating their requirements beyond the quoted lead time, manufac-

turers help suppliers plan parts production, which saves the suppliers money. The suppliers, in turn, pass on significant price reductions to the manufacturers.

With MRP II, manufacturers have the tools to execute plans quickly and reliably. This places a greater emphasis on planning demands. Innovative ideas, such as sales planning rather than sales forecasting, are making it possible to plan customer re-

quirements accurately and to hold specific sales representatives and territories accountable for meeting forecasts.

The authors of the best-selling book *In Search of Excellence* used the phrase "ready, fire, aim" to discuss getting new products to the marketplace quickly. MRP II has helped many companies introduce new products faster by helping them communicate their requirements (or

purchased and manufactured parts, plan additional requirements and coordinate engineering schedules.

Bridging the gap

Many of these companies are now looking at ways to translate design engineers' concepts into specific machine tool instructions more efficiently. Computer-aided design and manufacturing is beginning to play a major role in bridging the gap between the engineering department and the factory floor.

Bentley Nevada Corp. of Minden, Nev., a Class A user and leading producer of vibration-monitoring instrumentation, has been very successful at reducing the lead times it needs to deliver a product once a customer has placed an order. Recently, the firm brought up a new customer order entry system that significantly cut the time required for sales representatives to translate a customer's requirements into the company's parts numbers.

Other steps in the evolution of MRP II will focus on improving the reliability of schedules with quality improvements and reliable supplier deliveries. Companies will continue placing greater emphasis on chopping lead times and lot sizes. The goal will be to make the right items to satisfy customers; and to purchase raw materials and components in exactly the right quantities and just in time.

The productivity journey will undoubtedly include some surprises along the path, but companies with MRP II will have the tools and flexibility to meet the challenges ahead.



Alison Chappell, Suite of Reader 300. Courtesy The Bennett Institute.

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Special Report

Vision systems: Technology of the future at work today

Machine vision helping reduce costs, improve quality in modern factories

By John D. Meyer
Special to CWT

Machine vision has emerged as one of the most important technologies for the factory of the future, but it is useful as well in the factory of today.

If it is properly applied, machine vision can dramatically reduce production costs and improve product quality by enabling complete, accurate and inexpensive inspection of workpieces. In addition, machine vision systems can help robots identify workpieces and determine their position, orientation, shape and other characteristics.

Commercially available vision systems vary considerably in their capabilities. Typically, however, they can perform one or more of the following tasks:

- Identify shapes.
- Measure distances.
- Gauge sizes.
- Determine orientation.
- Quantify motion.
- Detect surface shading.

Today's vision systems perform these functions at high speeds, with high accuracy and repeatability and at relatively long ranges and stand-off distances; they need not contact the part they are inspecting. Furthermore, they perform at lower costs than other inspection schemes do.

Because they provide these functions, machine vision systems best serve three primary types of applications: inspection, part identification and guidance and control.

Inspection. Automated vision systems have the ability to recognize

well-defined patterns and to determine whether these patterns match ideal patterns stored in the system. This ability makes machine vision useful for the inspection of raw materials, parts, assemblies, containers and labels.

Inspection is, by far, the largest category to date for machine vision applications. But because most inspections are still done manually, this applications area is expected to undergo significant growth.

Part identification. In contrast to inspection, which examines an object's characteristics without identifying the object, part recognition focuses on the positive identification of an object. It uses this positive identification for decision-making purposes.



The market for machine vision systems in the U.S. is expected to grow from about \$60 million in 1984 to about \$1.2 billion in 1994. As the market grows, the distribution among applications types will shift somewhat.

During the past decade, machine vision technology has been used in a variety of applications across the three broad categories. Users have depended on machine vision for industrial measurement and control; medical testing and analysis; commercial data entry; satellite image processing; cartography; military reconnaissance; guidance and control; and scientific research.

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If properly applied, machine vision can dramatically reduce production costs and improve product quality.

Part identification applications for machine vision systems range from the familiar optical character recognition process to the more obscure operations of part sorting and bin picking.

Guidance and control. Increasingly, machine vision systems are being used to provide sensory feedback for real-time guidance and control applications.

In wide-ranging applications, vision systems can act as visual senses for industrial robots and for weld seam tracking or can work to calculate geometric offsets for part processing and assembly operations.

Various factors have led organizations to employ vision systems. In industrial measurement and control, for example, machine vision has been especially useful under the following three circumstances:

- When a visual inspection or feedback task is unpleasant or hazardous for humans to perform.
- When machine vision has capabilities humans do not have.
- When machine vision offers better performance than humans do, such as higher inspection speeds or lower error rates.

Because machines operate well under these circumstances, the poten-

tial for vision systems in manufacturing is enormous. The 1984 market for machine vision systems in the U.S. was about \$60 million. This represents sales of about 1,200 units at an average price of \$50,000. The total installed base at the end of 1984 was about 2,500 systems.

These figures do not include systems purchased as individual components and assembled by the end user (cameras, image processors and the like), nor do they include vendors' revenue from other areas (applications engineering, for example). When these other items are included, the 1984 market was closer to \$80 million.

The market for machine vision systems is expected to grow rapidly during the next decade, and by 1994, the market should be worth about \$1.2 billion.

In response to these growth projections, more than 100 companies now offer industrial machine vision systems for use in assembly, inspection and other manufacturing operations. Vision systems have become useful manufacturing tools and have led to the development of a new industry. Machine vision promises to be one of the most important technologies that will affect manufacturing during the next decade. The next few years should prove to be exciting for all parties involved with this dynamic young field.

Meyer is president of Tech Tron Corp., a Naperville, Ill., consulting and publishing firm specializing in manufacturing technology.

acceptance

Special Report

Vision system fuels Ford's drive to make perfect circuits

Machine aids in early detection of defects

LANESDALE, Pa. — A Ford Motor Co. electronics plant here has enlisted a machine vision system as part of an effort to turn out defect-free circuitry for the automaker's cars and trucks.

Each year the plant makes millions of thick-film circuits — miniature computers that control ignition, electrical current flow, fuel metering and other engine functions. Each square-inch module contains an average of five and as many as 12 layers

of electrically conductive and resistive materials. Each layer must be defect-free and must align precisely with adjoining layers.

A pinhole-size flaw anywhere or a hair's breadth misalignment between layers can render a circuit unacceptable — even a slightly flawed circuit runs the risk of breaking down on the road. Perfect circuits, on the other hand, can operate reliably for the lifetime of a vehicle.

A critical task is to inspect each layer as it is deposited to detect microscopic flaws that can creep into the fabrication process.

"Catching defects after they occur isn't the answer," according to Den-

nis Lex, Ford's manager of industrial and manufacturing engineering for electronic products. "Instead, we want to avoid defects completely by identifying trouble spots in the production process and correcting them before any bad parts are made."

Ford's search for a fast, precise inspection tool led the automaker to Invest in Synthetic Vision Systems, Inc. (SVS), which had developed a family of image-analysis computers capable of inspecting circuits quickly and with great accuracy. Ford currently has 17% ownership of SVS.

The Thick Film Laboratory here

installed a fourth-generation SVS Cyto-processor, a Cyto IV, last spring for a tryout and has since brought it into actual shop floor use. The factory-hardened machine consists of eight large-scale integrated circuits connected in a pipeline archi-

ture; it uses raster-scan operations to perform inspections. Every one-thirtieth of a second, the machine processes 250,000 pixels of information.

With the machine's processing speed, Ford can thoroughly inspect a thick-film circuit layer in 10 seconds. The Cyto IV can only inspect one layer at a time, and it is not incorporated into the production line. For every batch of layers, workers take a random sample of circuit layers off the line and to the machine for quality assurance inspections.

'Dumbest overall inspection routine'

The computer checks the circuit layer for eight characteristics, including thickness, alignment and location of circuit pads. "The SVS computer actually combines several key inspection routines into one operation and is replacing conventional inspection tools such as microscopes and optical-alignment gauges," according to William F. D'Arcy, supervisor of thick-film quality and process engineering at the plant.

If the machine spots a process problem that is not yet critical but is likely to get worse — such as screen printing on layers that is beginning to thin out — it signals the problem both to machine operators and to an AT&T Unix-based, Motorola, Inc. 68000-type host processor. Machine operators are alerted via a full-color VDT display on which the problem areas have been circled. The host processor performs statistical analysis to determine when the process must be adjusted to avoid faulty parts.

This ability is a critical one to Ford, according to D'Arcy. "Beyond [Cyto IV's] raw speed, what really impresses us is the computer's ability to spot incipient flaws before they become significant and to tell us where to make process control adjustments," D'Arcy said. "Controlling the process is the key to quality assurance."

Lex said Ford plans to phase the machine into the production line of its plant here over the next year. Different versions of the Cyto IV will inspect circuit layers during different stages of the production process. At any stage where a problem occurs, Ford will be able to stop the production line immediately and keep it down until the problem gets corrected. With on-line inspection, he said, the automaker will eliminate the need for both the random quality assurance checks and the statistical analysis.

The automaker also plans to work with SVS to test higher speed components and software for the machine. "Ford will continue as a principal field-test site for [SVS] as our two companies combine their engineering talents and gain actual product inspection experience," Lex said. "As a partner with SVS, we have a vested interest in making the Cyto IV the most commercially attractive system of its kind."

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Special Report

Vision tool scans, interprets images

Purd Motor Co.'s machine vision system, Synthetic Vision Systems, Inc.'s Cyto IV, performs two principal functions: circuit scanning and high-speed image interpretation.

Scanning and sensing. The Cyto IV's "eye" is a low-distortion close-up lens system coupled to a high-resolution, solid-state video camera. The camera is similar to a conventional television camera but provides much greater detail and has more stability.

A circuit module, taken from the production line, is placed on a moving platform below the camera lens. The platform, controlled by the computer, moves the circuit with thousandths-of-an-inch precision. At each of four platform positions, the camera scans the microcircuit circuit section, storing digital representations of the circuit in computer memory.

For an average 10-sq.-in. circuit, the camera takes 40 snapshots, one for every 14-sq.-in. Hundreds of thousands of light-sensitive sensors in the camera break each snapshot into a 500-line by 500-dot pixel image.

As the camera scans the circuit, it sends pixel data to the Cyto IV one line at a time. After the scanning is complete, the machine begins to interpret the visual information.

Image interpretation. Through this process, the Cyto IV can recognize shapes, sizes, patterns and edges. Using pixel data, it develops a computer-coded image of the circuit. It then eliminates everything but the topmost layer.

The Cyto IV compares electrical connections in this layer with connections in a perfect layer stored in the machine's memory. Next, the machine uses algorithms at each point on each circuit line and space to identify points that are too thin and may break when subjected to a car's engine heat. The topmost layer's registration is compared with the layer beneath it to verify that all elements align perfectly with each other.

The Cyto IV electronically scans for abnormal circuit features such as shorts, pinholes, cracks, chips, missing elements and other defects, including minor flaws that might allow the circuit to function initially but cause it to fail after a while.

With the Cyto IV's full-color display screen, operators can see exactly what the computer sees during the interpretation process; they can also freeze the image to look closely at a section. If the machine spots a flaw, it alerts the operator by drawing a circle around the flawed area on the screen image. The computer also advises the operator of the need for corrections on the production line and the type of corrections necessary.

Because the computer can distinguish between 256 different grayscale values, it can reveal details that might otherwise remain hidden in a circuit board's multicolored patterns. It uses edge information to help distinguish between extreme subtleties in shading and employs neighborhood processing techniques for grayscale analysis.

A group of nine pixels (a given pixel plus the eight pixels bordering it) represents a "neighborhood." The Cyto IV compares the mathematical value of the center pixel with those

of its neighbors and uses algorithms to identify and sharpen edge information. Neighborhood analysis allows the machine to locate circuit boundaries and features, which helps the computer analyze defects precisely.

Neighborhood processing involves billions of computations, a task that would choke most conventional computers. DP computers expend most of their resources estimating instructions from memory. To perform neighborhood processing, they must gain repeated access to each pixel that is stored in memory.

The Cyto IV employs an advanced

pipeline architecture and internal instructions that enable each of the Cyto IV's computing stages to perform neighborhood processing functions more efficiently. The machine spends no measurable time extracting instructions from memory; it extracts each pixel of information only once to perform eight or more processing tasks.



Machine vision plays a role in thick-film circuit production at Purd Motor Co., Leesville, Pa.

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Mr. DePinto's appointment as President of Perkin-Elmer, Inc. was announced by the company's Board of Directors on May 1, 1984.

As a high-level manager, Mr. DePinto has been responsible for the development and implementation of the company's strategic plan. He has also been instrumental in the development of the company's financial and operational systems.

CARL DEPINTO

Carl DePinto, President of Perkin-Elmer, Inc., has been responsible for the development and implementation of the company's strategic plan. He has also been instrumental in the development of the company's financial and operational systems.

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Special Report

Kanban techniques allow printer manufacturer's daily

HUDSON, N.H. — After applying kanban, or just-in-time, techniques to its production lines, a printer manufacturer here increased its annual inventory turn eightfold, quadrupled its daily production and cut its order turnaround time by two-thirds.

Centronics Data Computer Corp. implemented kanban manufacturing processes last July. According to Steve Cullen, director of the project, the implementation took about one month and cost the firm somewhere between \$75,000 and \$100,000 — mainly in fees for electrical and other maintenance work involved in rearranging Centronics' shop floor.

In return, the firm gained a num-

'If there is no true pacing of the line, and, ultimately, a buildup of work in progress, . . . you lose the initial advantage of the process.'

— Steve Cullen

Centronics Data Computer Corp.

- ber of benefits. In less than a year, it has done the following:
 - Increased annual inventory turns from two to 16.
 - Increased daily printer production from 100 to 400.
 - Cut average order turnaround

- from 90 days to 30 days.
- Cut the amount of time needed to make and test a printer from between seven and eight days to two days.
- Increased productivity against an ideal efficiency factor from 40%

to between 75% and 80%.

Centronics, which manufactures 25 different models of dot matrix, line and laser printers for the computer industry, turned to kanban techniques last summer when it faced an increase in the number of orders it received. The firm wanted to increase volume without incurring the expense involved in adding factory floor space.

The implementation centered around setting up the shop floor so that printers could be made as an assembly line, with each worker performing uncomplicated, discrete tasks. With this arrangement, production speed would increase, and inventory buildups would drop.

Preimplementation problems

"We were faced with two major problems prior to the implementation of kanban," said Ranga Iyengar, vice-president of operations at the plant.

"First, Centronics manufactures 25 different printers — all very similar up to a certain point — so each printer was being built by one individual, one at a time. Second, inventory management was difficult: Parts were being inventoried that might not be used for weeks or even months."

During one month of 80-hour workweeks, Cullen and his staff planned for the implementation, paying particular attention to shop floor logistics, which Cullen said was the most important part of implementing a setup based on kanban principles.

Process depends on producer's flow

"The process depends on the smooth and efficient flow of production," he said. "You can make room for all of the production lines you want, but if there is no true pacing of the line, and, ultimately, a buildup of work in progress, the entire operation is slowed down. You lose the initial advantage of the process."

To prevent bottlenecks that would disrupt work flow, Centronics coordinated logistics for each stage of the production process, from materials receiving, through product burn in and circuit testing — a process the firm calls the Rypet stage — and on to shipping (see chart).

On the materials receiving end, for example, the firm worked with its parts suppliers to schedule frequent deliveries in accordance with tight production schedules. As part of the kanban setup, Centronics keeps only one week's worth of most production materials in its warehouse, and the firm needed to make sure vendors delivered often enough to replenish supplies. Suppliers that made deliveries once every two weeks or once a month now do so twice a week.

In the warehouse, picking crews receive work orders that describe each printer model for production and all the parts necessary for the product along with its scheduled production date and the location where it will be assembled. A work order starts with a production sheet, the production cycle and leaves the plant with the printer as a history of its manufacture.

An IBM Cops shop floor release module, running on an IBM-type IBM 4381, generates the work orders and passes them on to a IBM Series/1,



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Special Report

production to quadruple

which prints them in bar code. Centronics also maintains other Copics modules — bill of materials, inventory planning and forecasting, inventory accounting, advanced-function materials requirements planning and purchasing and receiving — on the 4861.

Data collection software from Wakefield Software and a routing and facility package from Brunswick Interface with the Copics modules and complete the firm's manufacturing software system.

Printer shutdowns

Before any printer model goes into production, Centronics performs lengthy shakedown. Problems must be ironed out before production begins, Cullen said, because each stage of production is tightly coordinated with every other stage, and any blip that occurs during the production cycle can bring down an entire line.

On the shop floor itself, Centronics operates four production lines, each with 16 workstations. One employee works at each station, and each production line has two floaters, workers who can take over when an employee at any station takes a break.

Ideally, the kanban process involves breaking a production process down into small tasks that take no longer than three minutes to complete, Cullen noted. Centronics has stayed close to the ideal. At each workstation, one employee performs one simple task on each printer that comes before him — adding one mechanical assembly, for example — and forwards the printer to the next workstation.

Before each worker begins his task, he must check the accuracy of work done at the previous station. If the work is somehow faulty, the worker waiting to begin his task gives the product back to the previous worker so he can fix it. If a task must be redone, the whole production line stops. Cullen said the adverse attention this draws provides incentive for workers to do their jobs right the first time.

Decreased testing time

Together, the preproduction shakedown, simplified production tasks and on-line inspections have improved the quality of end products. This, in turn, has decreased the amount of time that Centronics must test each finished printer. Before the firm implemented kanban, Cullen said, it ran each printer for eight hours of post-production tests to ensure quality. Now, it runs each printer for only four hours.

Quality assurance inspectors also perform some off-line checks during the production cycle, but Cullen said these are less central to the kanban philosophy than the on-line inspections. With a kanban production cycle, he said, "you build quality in; you don't inspect it in."

In line with this, production halts whenever a problem surfaces. Supervisors on the floor keep a constant watch for yellow trouble lights — visible from anywhere on the shop floor — that workers switch on if they spot a problem. When this light appears, the entire production line stops; it cannot start again until the problem is alleviated.

Supervisors must be prepared to fix problems as soon as they occur or to reassign workers to similar operable lines. Centronics always has a corps of supervisors waiting to do so. "With supervision much more important in the kanban process, we have four supervisors and four group leaders on the floor at all times," Cullen said.

Once the production of a printer is finished, quality-control inspectors check the machine and put it into postproduction testing. After the tests are complete, the inspectors check the machine again then send it to the warehouse, where workers pack and ship it.

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Special Report

Multilevel pegging forms base for just-in-time concept

By **Stanley W. Chamberlain**
Senior Editor

In manufacturing, where speed is the name of the game, success in the future will depend on the ability of manufacturing and accounting systems to exchange pertinent information quickly and accurately as follows:

■ The purchase order system will order materials to support shop floor scheduling needs.

■ In turn, the manufacturing system will supply accurate and timely information about the progress of scheduled shop floor processes.

■ Ultimately, the manufacturing system will report this information to the general ledger, which will generate reports to guide future financial and manufacturing plans.

To allow for the exchange among systems, the software that will drive the factory of the future must provide multilevel pegging — the ability to peg each part of each contract through each level of the manufacturing process.

Detailed method

Multilevel pegging provides a detailed method of accounting for work in progress and for final manufacturing costs; it connects all component parts to an end item or customer order number. Regardless of the size of a purchase order or a shop order, a system with multilevel pegging can identify the contract number or the customer number for each part being incorporated into the end product.

Chamberlain is vice-president of manufacturing for **McCormack & Dodge Corp.** He works out of **M&D's** Dallas office. Formerly, Chamberlain was president of **Rush & Strong Systems Products, Inc.**, which **M&D** acquired in March.

This ability provides a strong backbone for the just-in-time philosophy on which factory managers are beginning to focus. The philosophy also at one goal — reducing inventory — and achieves this goal by effecting seven moves:

- Zero defects.
- Zero set-up time.
- Zero lot sizing.
- Zero handling time.
- Zero surging.
- Zero breakdowns.
- Zero lead time.

The success of the just-in-time philosophy lies in its ability to identify, comprehend and adjust rapidly to the impact of a work interruption or stoppage, and multilevel pegging assists throughout the process.

Identification occurs when factory management focuses on the current area in trouble. Comprehension occurs when a statement is made as to what next assembly or assembly will be delayed. Adjustment occurs when management determines a course of action and immediately relays that to the manufacturing work force, thus re-prioritizing the work effort.

Any activity that affects the flow of production — an unusual scrap occurrence, the processing of an engineering change or the change of a master production schedule, for example — calls for re-prioritization. Managers must respond immediately to make sure that employees are not working on jobs that are no longer needed.

If managers are to respond quickly to change, they must be able to identify which and items a particular shop order satisfies. They must know this data at all times on a real-time basis to compensate quickly for scrap or for schedule adjustments and to bill accordingly.

Multilevel pegging provides them with the necessary linkage. When it is in effect, every part can be immediately associated with mating parts. If a part is scrapped, the schedule for its mating parts can be altered to coincide with the new completion date.

When managers use this information to re-prioritize their operations, they direct work toward only those parts that can be built — and thus those that can be shipped. They avoid unnecessary inventory bills and prompt the efficient use of labor.

Accurate cost accounting

Multilevel pegging also allows for accurate cost accounting because it identifies individual parts and charges, which managers can allocate to specific contracts, departments or customers. For a system to work this way, however, manufacturing software must be integrated with accounts payable, purchase order and general ledger software.

Cost management systems must determine the actual manufacturing cost from bill of materials information, inventory information and labor information; additionally, they must generate journal entries into the general ledger. The reports generated by the general ledger will, in turn, help managers spot problems in work in progress and accurately cost out a completed job for billing. This will ensure that costs are accounted for properly.

Buyers of manufacturing software systems should be wary of software systems that cannot identify all component parts of an item or customer order number; such systems will not provide support for the just-in-time philosophy. With a dynamic communications network such as multilevel pegging, however, the seven moves of just-in-time can be achieved, and the factory of the future will be a reality.



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*Computerworld, August 30, 1984

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Special Report

Flexible systems ease work flow

By Keith B. Delton
Special to CWS

The flexible manufacturing system is the next step in the evolution of factory integration. Flexible manufacturing systems and manufacturing cells will smooth the flow of manufacturing in the factory of the future.

A flexible manufacturing system can be defined as a computer-directed integrated system of machine tools and materials-handling equipment designed to manufacture a variety of workpieces at low to medium volumes. A flexible manufacturing cell is a simplified version of a flexible manufacturing system. Properly planned implementation of flexible manufacturing systems will lead to reduced lead time, work in process and inventory and increased flexibility and improved quality.

Flexible manufacturing systems integrate the following three critical manufacturing components:

- CPUs.
- Machine tools.
- Materials-handling equipment.

Central to the concept of flexible manufacturing is the system's ability to integrate these three components to make a variety of products without changing machine tool layout.

A flexible manufacturing system machine tool configuration should be able to produce a variety of finished products. Supervisory computers monitor the completion of each piece and download instructions to the numerical controller. Most important, a well-designed flexible manufacturing system can accommodate sudden increases in production requirements with little setup time.

There are two basic types of flexible manufacturing

systems as follows:

- Random order (nonsequential).
- Dedicated (sequential).

Computer integration

Computer control is the glue of the flexible manufacturing system. Supervisory devices range from mainframe computers to minis and micros to programmable logic controllers. The critical link between the CPU and the machine cell is made possible by an industrial local-area network.

Data processing in a typical computer-integrated factory takes place at the five following levels:

- Plant.
- Machine center.
- Machine cells.
- Workstation.
- Machine tools.

The flexible manufacturer as system CPU, usually a minicomputer, serves as the link between large, plant-level mainframes and lower level programmable logic controllers and computer numerical controllers. The mini supports a number of manufacturing functions, such as production and machine load scheduling, monitoring work in process, program downloading, communications to corporate-level computers and system diagnostics.

An essential requirement for flexible manufacturing system software is real-time operation. The operating system must be able to complete numerous subtasks instantaneously and simultaneously.

Operating system software is just one of several packages needed to control a flexible manufacturing system. Another is group technology software, which enables similar machines to maximize tooling and scheduling functions. Maintenance and dispatch software, however, may be most critical in the evolution of the flexible manufacturing system.

Technology

A three-year world recession has made it necessary for U.S. manufacturing industries to redefine their needs. The machine tool industry, which collapsed in 1982, was a major casualty of this recession. The surge in investment that began in 1984, however, may boost the market for machine tools, which was worth \$2.8 billion in 1984, to an \$11 billion market in 1990.

The Manufacturing Automation Planning Service branch of the Yankee Group, a Boston-based market research firm, estimates that the market for flexible manufacturing systems and flexible manufacturing cells (a simplified version of a flexible manufacturing system) was worth \$265 million in 1984 and will increase sharply to \$1.8 billion in 1990. By 1990, 10% of all machine tools sold will be capable of operating unattended in a flexible manufacturing configuration.

While the growth of the flexible manufacturing cell market will be closely correlated with the computer numerical controller market, the flexible manufacturing cell market will grow much faster than the flexible manufacturing system market. It is estimated that the installed base of flexible manufacturing cells will grow from 150 in 1984 to close to 2,000 flexible manufacturing cells in operation in 1990. By contrast, an estimated 30 flexible manufacturing

Delton is an industry analyst for the manufacturing automation planning service of the Yankee Group, a Boston-based industry research and market analysis group.

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Special Report

to boost machine tool mart

systems were in operation in the U.S. at the end of 1984 (Figure 1), and it is estimated that there will be more than 200 operating in 1990.

Surveys indicate that 56% of all flexible manufacturing systems are presently used for manufacturing machinery, 41% for transportation components and 3% for electrical machinery. As the flexible manufacturing system market increases in size, these proportions will not change noticeably, although the construction and materials-handling industries will have garnered 15% of all installed flexible manufacturing systems in five years.

However, a number of factors may affect the increasing use of flexible manufacturing. While the U.S. Department of Commerce estimated that new plant and equipment expenditures for 1984 would be nearly \$550 million — the largest increase in 17 years — the decisive factor in the adoption of flexible manufacturing systems is how aggressively U.S. manufacturers will pursue automation technology.

However, the number of corporations willing to make the necessary commitment to change will be small during the next two years.

Who

Who will be the major players in this burgeoning market? The Yankee Group sees five major companies

with the potential to become leaders in the field, including Cross & Trecker Corp.; Cincinnati Milacron, Inc.; Oldcastle & Lewis Machine Tool Co.; Mamak Corp.; and White-Strauss Machine Tool Co. Looming behind these five is General Electric Co., which owns a small share of the market but is very committed to developing automation solutions. A handful of smaller companies will have difficulty finding opportunities behind these industrial giants.

Machine tool vendors will dominate this market because machine tools constitute the most common component of the flexible manufacturing system. Additionally, these vendors understand the shop floor and recognize that flexible manufacturing systems and cells constitute value added for their products. This element provides these vendors easier entry to the flexible manufacturing system market than the established minicomputer vendors, such as Digital Equipment Corp., IBM, Data General Corp. and Perkin-Elmer Corp.

Vendors are now poised to take advantage of strong demand for machine tools. However, to venture into the flexible manufacturing system arena, these single-source vendors must become familiar with numerous automation technologies, especially in the area of computer integration. Few vendors are capable of this.

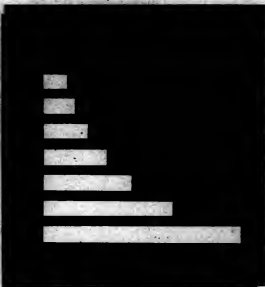


Figure 1.

On the user side, a potentially large investment like a flexible manufacturing system requires users to weigh gains and goals carefully. Users might consider a flexible manu-

facturing cell, rather than an entire manufacturing system, because they are less complex, less expensive and still offer the possibility of system upgrade.



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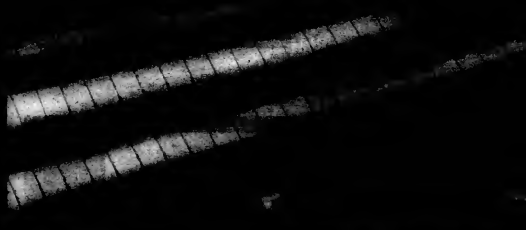
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Special Report

CIM unit helps direct design traffic

TRON, Mich. — With the Big Three automakers as its primary clients, a manufacturing firm here had to maneuver around a challenging roadblock in its search for a computer-integrated manufacturing (CIM) system.

Delta Model & Mold Co., which designs and builds prototypes, models and production molds for automobile components, wanted a system that could accept computer-aided design information from each of its clients. General Motors Corp., Ford Motor Co. and Chrysler Corp., however, all used different equipment.

In addition, Delta Model wanted a system that allowed it to transfer de-

sign information from CAD systems in its own engineers' offices to numerical control machines in its shop.

"We had two criteria for choosing a CIM system," said Peter Moser, the firm's manager of computer numerical control engineering. "First, we needed a system that could communicate with virtually any CAD system over the telephone. Second, we needed a system that could talk to the factory floor."

In 1983, Delta Model began to piece together a system that met both criteria. The firm began by purchasing computer-aided design and manufacturing software and four engineering workstations from Cadline,

Inc. The machines, 32-bit CIM Stations, have 30M bytes of hard-disk storage. Engineers use them for mold design, numerical control programming and scheduling.

Since then, Delta Model has connected the workstations with CIM Net — Cadline's local-area network — and has added a factory-hardened version of the vendor's workstation, called CIM Factory Manager, and a 150M-byte hard-disk storage device, known as CIM

Delta Model & Mold Co.'s CIM system fuses design files with the prototype firm's automotive clients.

Manager. The CIM Manager also supports a tape device for off-line storage.

As it brought in the CIM components, the firm expected a number of results, Moser said. "We at Delta Model saw the primary benefits of [CIM] as increased accuracy, reliable prediction of delivery dates and improved cost control."

In practice, he said, the firm has gained the most from improved accuracy. Because designs go directly from automakers' CAD systems to Delta Model's CAD network and directly from there to the production line, shop floor managers never have to interpret drawings and translate them to machine instructions. "We're cutting what they design," he said.

Delta Model can accept design data from its clients in one of the following two ways:

1. Over the phone. CIM is the only client that transmits CAD data this way. It sends its designs via phone lines and modems to Delta Model's CIM Manager.

2. From magnetic tapes. Other clients, including Ford and Chrysler, deliver tapes that Delta Model loads onto CIM Manager.

Cadline software on the CIM Manager converts the data into a common format that Delta Model's machines can use.

Once the data is stored on CIM Manager, the firm's design engineers can access it from any workstation. They use CAD data from their clients to generate tool layouts, fixtures and drawings and send these back — over the phone or on magnetic tape — to the automakers for approval.

Once the client approves the work, Delta Model's engineers edit and refine the design data for compatibility with numerical control machines. They eliminate redundant geometry, noncontinuous geometry, construction lines and other information that is not suitable for a machine environment.

The design engineers then send the data to the CIM Factory Manager on the shop floor, which feeds the information to the firm's numerical control machines. Machine operators initiate production processes and can make any adjustments by working with design data that resides on the CIM Manager. Moser said shop floor adjustments are rarely necessary.

The CIM Manager also communicates with Delta Model's coordinate measuring machine, which checks finished products against their original design to ensure that they are within a client's defined limits of tolerance. This quality assurance data is output to printers and sent to the automakers that ordered the work.

In the future, Delta Model expects to automate its operations more fully. Moser said the firm hopes, for example, to bring color capabilities to its mold design operations.



MICROCOMPUTERS

Micro tools speed system development

By Paul Marzabovetti
CW Staff

Given the choice, an MIS manager would rather locate a problem in a system blueprint than find one six hours or six years after a system has been running. In the design phase, problems can be fixed by erasing a few lines. When the system is completed, code must be rewritten, tested and replaced — a costly process.

Recently introduced microcomputer software packages help to identify problems in the design phase, replacing the pencil-and-paper approach with automated tools. The tools enable a programmer to construct a system model, which helps to evaluate a proposed system design and enables users to understand how a system will work.

Last year the quality control division at Mayhewline Cosmetics, a subsidiary of See Design, a subsidiary of

Dunsplo Tool Kit debuts, aids software customization

WILTON, Conn. — Dunsplo introduced a software kit for customizing the company's integrating software package, changed licensing practices for the package and extended its offerings of IBM Personal Computer products.

The Dunsplo Tool Kit is said to aid microcomputer support staff in modifying Dunsplo software that runs on Personal Computer XT's.

The menu-driven package reportedly allows nonprogramming staff to build custom logo and menu screens, integrate additional applications more completely and boost available hard disk drive space. The Tool Kit, with training and support, costs \$890.

The vendor has also unbundled the Dunsplo software from the previous hardware/software package. With documentation, one year of telephone support and software updates, Dunsplo costs \$1,300. A two-day introductory training seminar costs \$485.

A new corporate license plan for volume purchases puts the price of the software at

\$1,000 each for the first 250 copies and \$500 for each additional copy.

The vendor has also expanded and re-priced its systems offerings, with all hardware sold only in conjunction with software. Dunsplo will remarket the entry-level Personal Computer AT and add hard disk drives to various floppy disk models.

The entry-level AT costs \$5,895, the enhanced AT costs \$6,795 and the hard disk drive XT costs \$3,895. Personal Computer, Personal Computer XT and Portable Personal Computer models with 256K bytes of internal memory and a single floppy disk drive are priced at \$1,995, \$1,270 and \$1,595, respectively.

Customers who buy the enhanced AT can choose among Computer Memories, Inc.'s 20M-byte hard disk drive, priced at \$1,650, or Control Data Corp.'s 30M-byte drive, which costs \$2,145. Imago Corp.'s 20M-byte Bernoulli Box storage system is available for other machines for \$3,245.

Dunsplo is located at 187 Danbury Road, Wilton, Conn. 06097.

■ Paledin Software introduces Crunch, an integrated package for the Macintosh/88

■ Epson America rolls out nine personal computer printers/88

Microsoft offers Xenix versions of Fortran, Pascal, Cobol, Basic

BELLEVUE, Wash. — Microsoft Corp. has announced Xenix versions of Fortran, Pascal, Cobol and Basic development languages.

Using Microsoft's version of the development language programs written for Microsoft's MS-DOS version of a language can be transported onto its Xenix-286 environment. The Microsoft languages also reportedly permit programs to be downloaded from mainframes to the Xenix environment onto a microcomputer.

The languages — Microsoft Fortran, Microsoft Pascal, Microsoft Cobol and Microsoft Basic — each allow users to link into Xenix system libraries and incorporate Xenix features, including record and file locking, shell support for communication

with the operating system during program execution and pipes that permit the exchange of information between two programs, a spokesman said.

Features included in Microsoft Basic give users access to both Xenix screen handling features and its file system. Users also have a choice between a binary math package and a decimal math package. The product includes capabilities for reading and writing to variable-length disk files using sequential, random or multilevel index sequential access methods. Lines of code can be examined as they are entered or all at once. Microsoft Basic sells for \$550.

Microsoft Cobol is fully compatible with See Xenix page 63



Micro nets not caught in slump

"The whole computer industry is in a pause, an inflection, that happens about once every 10 years," said 3Com Corp. President William Krause. "Customers have stopped to reevaluate their equipment needs. They're not sure how they're going to integrate their new [personal computers] with their mainframes."

See NETS page 61

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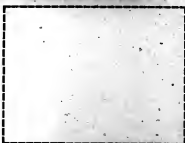
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20- to 100 applications	Yes	No
Codes	Yes	No
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Shared Resource Operating System	Yes	No
Removable Storage Capabilities	Yes	No
Local Area Networks	Yes	No
Authorized by OASIS	Yes	No
Advanced Data Base	Yes	No
Industry & Government Word Processing	Yes	No

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MICROCOMPUTERS

Quadram net, printer, modems debut for IBM micro

NORCROSS, Ga. — Quadram Corp. has introduced a local-area network, several onboard modems, a low-cost laser printer, a transposable personal computer and a raft of multifunction cards for the IBM Personal Computer, including one that would permit Lotus Development Corp. software to address up to 32 Mbytes of memory.

The Quadnet II local-area network costs \$1,005 for its Master Kit, which consists of a network interface card, a user manual, operating software and a key card to prevent unauthorized access.

With the \$295 user interface card, Quadram said it has positioned Quadnet II as a low-cost means to link up to 32 Personal Computers. A base-band network, it uses telephone-type wiring to link the machines and reportedly offers data transfer at 1M bit/sec.

The Quadmodem II line of stand-alone and half-card modems reportedly offers either full- or half-duplex operation and can be used with the

IBM Personal Computer line. The half card supporting 200 or 1,200 bit/sec. transmissions costs \$495; the half card supporting those speeds plus 2,400 bit/sec. costs \$795; the stand-alone supporting 200 and 1,200 bit/sec. transmissions costs \$595; and the stand-alone supporting those speeds and 2,400 bit/sec. costs \$895.

The \$3,795 Quadprinter printer is said to offer seven fonts and a font editor as standard features and to include all of the supplies needed to begin operation.

It can print at speeds up to eight page/min and delivers 300 dot/in., Quadram said. The printer comes with 256K bytes of onboard memory,

expandable to 3M bytes.

The personal computer is said to be IBM Personal Computer compatible and to offer an EGA-16, diskette drive. Called the Datacube 25, the standard version of the machine includes a cordless keyboard, LCD, 128K bytes of memory (expandable to 640K bytes).

The product costs \$2,195. A 640K-byte version with those features costs \$3,795.

The Quadram Liberty card reportedly takes advantage of the Lotus Expanded Memory Specification to permit both Lotus 1-2-3 and Symphony programs to address up to 32 Mbytes of memory as if it were standard random-access memory (RAM).

Prices range from \$395 to \$1,395 in memory configurations ranging from 64K to 32M bytes.

The board also offers the option of split memory mapping, under which a portion of the Quadram Liberty board could be used to bring a Personal Computer's internal RAM up to 640K bytes. The Gold Quadmodem is said to be a multifunction board with color graphics included. Also included is a feature called Keyserver, which holds the input data in read-only memory until the user can retrieve it. Prices for the board range from \$595 without memory to \$795 with 384K bytes of memory.

Quadram is located at 4366 International Blvd., Norcross, Ga. 30068.

Nestar nets get multiuser tools

PALO ALTO, Calif. — Nestar Systems, Inc. has announced the availability of multiuser applications development tools for the company's microcomputer local-area networks. The tools include MDBS III from Micro Data Base Systems, Inc.; Btrieve/N from Software, Inc.; LAN: Datascore from Software Connections, Inc. and Revelation from Comshare, Inc.

MDBS III is said to be an extended network data base management system modeled after Cullinet Software, Inc.'s DBMS and is said to provide many tools previously available only on mainframes. The development version of MDBS III, DBMS costs \$20,160 and requires a dedicated data base server as well as a Nestar file server.

Btrieve/N reportedly is a record management system that provides high-level access and manipulation of records in a data base and interfaces to Basic, Pascal, Cobol and C programming languages. The software permits applications developers to ignore physical file structure and concentrate on logical file structures, Nestar said. A Btrieve/N license for six users is priced at \$595.

Applications open data bases

LAN: Datascore is a relational applications development tool that can produce applications that open multiple data bases. The software is priced at \$845 for five simultaneous users per data base and \$1,945 for 16 simultaneous users per data base.

Revelation, a multiuser data base package modeled on the Pick Systems—Pick operating system, reportedly permits developers to write applications in a Basic-like programming language. Revelation is priced at \$2,000 for up to four simultaneous users and \$200 for each additional user.

Nestar Systems is located at 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

Lotus on a VAX?

dBASE II on a VAX?

Friday! on a Micro VAX?

Condor on a PDP-11?

FRS-File on a PRO?

Personal Pearl on a VAX?

QuickCode on a Micro VAX?

Spellbinder on a VAX?

WordStar on an MV10000?

Ribase 4000 on a VAX?

Multiplex on a PDP-11?

PL/M on a VAX?

SuperCalc 3 on a PRO?

TMaker Integrated on a VAX?

MS BASIC on a Micro VAX?

Milestone on a PDP-11?

Palatir on a PDP-11?

SpellStar on a PRO?

MailMerge on a PDP-11?

PMS II on a VAX?

dBASE II on a PDP-11?

Lotus 1-2-3 on a PDP-11?

Open Access on a PRO?

MS FORTRAN on a VAX?

Condor on an MV10000?

Multiplex on a PDP-11?

WordStar on a VAX?

SuperCalc 2 on an Eclipse?

PerfMaster on a PRO?

Palatir on a VAX?

QuickCode on a PDP-11?

DISC-DML on a VAX?

PerfectWriter on a PDP-11?

WordStar on a PDP-11?

Spellbinder on an Eclipse?

Friday! on a VAX?

PerfectWriter on a PRO?

RM/COBOL on a PDP-11?

RTS/UDL on a VAX?

Mass-11 on a PDP-11?

Milestone on an Eclipse?

Lotus 1-2-3 on a Micro VAX?

Peachtree on a VAX?

SpellStar on a Micro VAX?

Mass-11 on a PRO?

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MICROCOMPUTERS

Epson America unwraps micro printer products

TORRANCE, Calif. — Epson America, Inc. has announced nine microcomputer printer products.

The BS-80 Letterjet is said to be a nine-needle portable ink-jet printer with both dot matrix and near-letter-quality print modes. It reportedly produces draft-quality prints at 160 unidirectional char./sec. and near-letter-quality prints at 32 unidirectional char./sec. It is priced at \$446.

The SQ-8000 is an ink-jet printer with a self-cleaning print head for business and near-sensitive environments, the vendor said. The 24-needle print head reportedly produces 136-cpi prints at 170 char./sec. in draft mode and 100 char./sec. in letter-quality mode. Graphics resolution is said to be a maximum of 240 dot/in. The product is priced at \$2,995.

The DX-10 and DX-30 are said to be desktop, letter-quality printers compatible with any software using Diablo Systems, Inc. 630 printer drivers. The 83-cpi DX-10 reportedly prints at 10 char./sec. and sells for \$390.

The DX-20 is said to include a 1K-byte print buffer, an interface to a variety of computer systems and an optional keyboard that allows the printer to function as a typewriter. The DX-20 is priced at \$490.

The Spectrum LX-90 is said to be a dot matrix printer with draft and near-letter-quality modes. The product includes a printer interface cartridge for plug-in compatibility with the IBM Personal Computer and PCjr and the Apple Computer, Inc. Apple IIc.

The 80-cpi printer operates at 100 char./sec. in draft mode and 16 char./sec. in near-letter-quality mode. It is priced at \$386.

The Epson America division CE-120 printer buffer and CE-700 and CE-701 A-B switch boxes are said to improve a micro's document production by freeing the computer for other tasks while the printer operates. The buffer is said to feature built-in serial-to-serial, serial-to-parallel, parallel-to-parallel and parallel-to-

serial interfacing and 128K bytes of memory. The buffer sells for \$239.

The CE-700 reportedly supports parallel interfaces, and the CE-701 works with serial interfaces. Both switch boxes sell for \$30.95.

The P-80X, designed for use with the Epson Geneva portable computer, is said to be a portable letter-quality printer. It provides 23 char./sec. letter-quality printing and 46 char./sec. draft printing in a variety of type styles, according to the vendor. The cost of the P-80X is \$379.

Epson America is located at 2780 Lemita Blvd., Torrance, Calif. 90505.

DEC A-To-Z office system targets business management needs

MAYNARD, Mass. — Digital Equipment Corp. has announced the release of its A-To-Z Business Office System, which is configured for the word processing and business management needs of companies with annual revenues less than \$100 million.

The system consists of DEC's MicroVAX-11 multitier computer, the company's Decwrite word processor workstation and its A-To-Z business software.

It is said to provide desktop word processing on the Decwrite integrated with A-To-Z accounting, graphics, spreadsheet, data processing and document transfer capabilities on the

MicroVAX-11. A-To-Z modules share the same menu and user interfaces and contain help facilities for beginning users, the vendor said.

A typical system configuration comes with one Decwrite III word processor, WPS-8 software, one VT220 terminal, one MicroVAX-11/85 with P-11 CPU, a 600K-byte RLS0 database, a four-color background, the A-To-Z Integration Kit, A-To-Z Word Processing software and A-To-Z Document Transfer package and is priced at less than \$12,500, according to the vendor.

DEC is located in Maynard, Mass. 01754.

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ces and easy-to-use, low-cost display printers, too.

But product selection isn't the only choice. Telex displays offer features like color graphics, monochrome or color monitors, and ergonomic tilt/swivel design. There's a selection of keyboards,

Newsletter debuts for Mac users

FRAMINGHAM, Mass. — Pord-LePage, Inc. has announced "Macintosh," a monthly newsletter designed for Apple Computer, Inc. Macintosh users.

The newsletter will contain summaries of a number of bulletin board services, tips on how to use these services effectively and references for users desiring more information. Product reviews, Macintosh sales figures and service information also will be included in "Macintosh."

A yearly subscription costs \$48. The newsletter will not accept advertising.

More information is available from Pord-LePage, P.O. Box 786, Framingham, Mass. 01701.

MICROCOMPUTERS

NETS See page 58

and maintenance."

While not everyone accepts that diagnosis, action in personal computer or local-area networking keeps picking up despite the overall industry slowdown. Some notes and quotes taken in the past month follow:

■ Licensing. Asked about site and network licensing at last year's Comdex/Spring, most software developers would have responded positively: "No, we don't do that." This year, their blood pressure would climb visibly. They would struggle for breath and then say, "Yes, we're working on it; we're talking with our customers."

"A corporate user has a right not to pay full retail price," said Edward Reiser, president of Ashton-Tate, who emphasized his firm's willing-

ness to discuss licensing with customers. Reiser added that Ashton-Tate will make efforts to upgrade software, for example, by offering lower prices for disks that do not include all of Ashton-Tate's support services. But offering buyers to make unlimited copies "is outside for any software company," he said.

For vendors, site licensing is a mine field, with obstacles ranging from the impact on the bottom line to protection schemes to ways to keep dealers happy by cutting them in on the action — whether or not most corporate customers want dealers to get involved. Network licensing complicates life further.

So companies like Lotus Development Corp. are self-policing the generic network license in new applications like Symphony Release 1.1 and holding off on network-aware ver-

sions. Sometimes this year, the clouds will part.

■ PC Network. As network and applications vendors scramble to implement IBM-508 3.1 and applications compatibility with IBM's PC Network, most first users are giving that not-televised reviews.

Their consensus is that PC Network is a solid product, easy to install and well documented, reasonably priced and offering acceptable performance. But the performance and general patch don't reach the level some computing network products provide, and the product may be most appropriate for small installations, most users say.

Whether or not they want to ride IBM's coattails, other network vendors, naturally enough, are bolder in their approach. The demonstration "really doesn't tell you what the

rules are," one executive said. He also criticized the hardware requirements. "Tried-length cable looks like a good idea until you see it in spots behind people's desks."

Symposium continues that the PC Network represents a short-term move that doesn't really fit into IBM's grand Systems Network Architecture strategies. "We believe the PC Network is a solution for the interim," Kravitz said.

Rapid introduction

■ Fast tolerance. At next month's PC Expo in New York, Hewlett, Inc. will introduce "system-level software that will allow people to tie off-the-shelf hardware into a multi-processor system," according to Hewlett's president, Ray Noorda.

The software will boost backup and restore capabilities and handle bad disk sectors while on-line, said marketing Vice-President Craig Buxton. The hardware will feature an IBM Personal Computer AT with mirrored 20M-byte drives, with an added disk expander.

How important is fault tolerance? "It's a niche market," said Harry Reed, founder of Master Systems, Inc., which began shipping fault-tolerant sets last summer. He pointed to a number of potential transaction-processing applications, particularly in financial firms. Banks handling billions of dollars daily would gladly pay for another network file server, he said. "A one-day or a one-hour outage is very expensive."

"Fault tolerance is useful and will become increasingly important," said SCM's Kravitz. But it's a "little premature" for personal computer networks, which still are weak in minicomputer-like development tools for transactional processing, he maintained. Creating and fully utilizing these tools for a network environment is no small task, he said.

"Distributed file systems have not been invented yet."

"Fault-tolerant systems have always been a part of our plan," but relatively few installations will require them, said David Robinson, president of Banyan Systems, Inc.

Gathering momentum

■ Backbones. A logical approach to networks, with local area connected by high-speed backbones, seems to be gathering momentum. In one example, with more than 100,000 nodes connected worldwide, Curran Systems, Inc.'s Omnetix "needs to come out of the work group," said marketing director William Landri. The backbone network could be provided by Proteon Association, Inc., Sytek, Inc., Ungermann-Bass, Inc., IBM or some other vendor, Landri said.

■ Database personal computers. There have not stirred the market, but "the concept is alive and well," Landri said. "It just makes sense. You don't need a floppy there, in many cases — it's just a very, very expensive key."

There are obvious financial reasons and obvious mechanical reasons why a database where mainframes, Reed said, but security concerns are driving the concept. "Typical large companies are very concerned about loss of data."

Noting the advantages the concept could present to IBM departments, Kravitz predicted that IBM will introduce a database Personal Computer for its three-ring local-area network.



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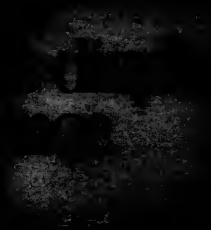
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COMMUNICATIONS

AT&T to bypass former Bell offspring

By John W. Cline

AT&T recently agreed to bypass a former Bell operating company, showing it is more loyal to its financial health than to its onetime offspring.

At the behest of Merrill Lynch & Co., AT&T has agreed to use a fiber-optic network operated by Teleport Communications to connect Merrill Lynch's new headquarters to AT&T's access point in Manhattan.

Although some users already bypass local telephone companies to reach AT&T by procuring their own access, this is the first time AT&T has arranged to bypass a former Bell operating company to provide service directly to a major customer.

AT&T had, in fact, once said it would not bypass the divested Bell operating companies unless the local carriers "were willing or unable to provide access at

market price/performance levels," according to Jerry Thames, general manager of AT&T Communications' network services. AT&T did not, however, take into account the possibility of a customer requesting the use of alternate facilities, as was the case with Merrill Lynch.

Teleport Communications is 85% owned by Merrill Lynch and 15% owned by Western Union Corp. It is the communications arm of the Teleport Project, a real estate development project on Staten Island being developed by the New York and New Jersey port authorities.

Besides new office buildings, the project will have a satellite datacenter farm. Teleport Communications will use the satellites and other facilities to provide communications services to Staten Island tenants as well as to link New York companies to the complex with a fiber-optic network. That net is also being marketed as a

point-to-point bypass system within the city, according to Bob Anagnosta, senior vice-president of Teleport Communications.

When Merrill Lynch decided to consolidate its many New York offices within the World Financial Center in Manhattan, it approached AT&T and "asked what kind of deal AT&T could make to provide service there," AT&T's Thames said. "Merrill Lynch indicated that it was interested in AT&T using [Teleport Communications], its subsidiary, to provide access."

AT&T bowed to the pressure. It had to use Teleport Communications to bypass New York Telephone Co., which has been retained for other services, or risk losing Merrill Lynch's business.

"AT&T has to respond to competitive pressures. It has a responsibility to its stockholders, its employees and its customers," according to Chuck Jackson

See BYPASS page 86

■ Dena Telecommunications announced a line of voice and data communications services/86

■ Wang Laboratories signed a contract to purchase local-area network products from Ungermann-Bass/86

■ Pacific Bell has announced plans to allow customers with private communications networks to re-arrange or vary transport capacity from their own premises/87

■ Digilog has upgraded its Network Access Switch to handle more ports at greater speeds/87

ANALYSIS

Infotron offers data switches

CHERRY HILL, N.J. — Infotron Systems Corp. has announced a family of switching products that includes a high-end data switch and an electronic matrix switch, as well as enhancements for a mid-range data switch.

The INX4400 is a Winchester disk-based electronic data switch that succeeds Infotron's IN4000; that older switch can reportedly be upgraded to INX4400 functionality. The switch is said to support 4,000 devices and 2,000 simultaneous cross-connections at 9.0K bit/sec. and 1,000 cross-connections at 19.2K bit/sec. Although the data switch was designed primarily to enable asynchronous terminal devices to access multiple hosts — instead of being wired directly to one processor — synchronous RS-232 circuit cards are also available, the vendor said.

Available now, the INX4400 costs between \$200/port and \$500/port, depending on configuration. See SWITCHES page 88

Tandem backs GM's MAP, more ISO levels

CUPERTINO, Calif. — Tandem Computers, Inc. has announced plans to support General Motors Corp.'s Manufacturing Automation Protocol (MAP) and various levels of the International Standards Organization's (ISO) network reference model.

MAP is a seven-layer net architecture model that General Motors is developing in accordance with the ISO's Open Systems Interconnect model. MAP specifications have been placed in the public domain so that companies can develop products for GM or other manufacturing facilities working with MAP. Tandem plans to design products that will conform to MAP specification 2.1, the latest version of the model's specifications.

In addition, Tandem intends to supply See TANDER page 88



DATA STREAM
Paul Kupperman
CIS Data User

ISDN: Solution or vendor elixir?

The scene has been played out in numerous Western movies. A wagon pulls into a town, and a charlatan begins spouting about a new wonder drug that will cure common colds, feed livestock, restore hair and transform dirt into gold.

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See ISDN page 88

INSIDE

Voice/Data Communications/87

Auxiliary Equipment/87

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Dama offers line of voice/data telecom services

PARSIPPANY, N.J. — Dama Telecommunications Corp. has announced a line of voice/data services.

The services, National Voice Network, Corporate Voice Network, Digital Data Link and Integrated Voice/Data Network, run on Dama's Dama-net network. The network resulted from the consolidation of Dama's switched digital network with the private telecommunications network purchased from International Harvester Co. last year.

National Voice Network is a Wata-type service that features call routing within 80% of U.S. exchanges and to Alaska, Hawaii, Puerto Rico and the Virgin Islands.

Dedicated access lines are needed from the customer's premises to Dama-net switching facilities, which are located in Chicago, New York, Philadelphia, San Francisco, Memphis, San Diego and Washington, D.C.

Corporate Voice is a private-line-type service for high-volume calling. It requires dedicated line access and features seven-digit dialing, special billing arrangements and optional customized directory assistance.

Problems

Both voice services offer free call detail reporting and advanced diagnostics through automatic trunk routing.

The Digital Data Link service is for point-to-point dedicated digital data transmission channels at 2,400, 4.8K, 9.6K, 56K or 1.53M bit/sec. Local access is supplied by point-to-point microwave or by local carrier exchange terrestrial digital facilities.

The service is available in New York; Philadelphia; Harrisburg, Pa.; Altoona, Pa.; Pittsburgh; Youngstown, Ohio; Dayton, Ohio; Cincinnati, Co-

lumbus, Ohio; Indianapolis, Wilmington, Del.; Baltimore; Washington, D.C.; and Chicago.

The Integrated Data/Voice Network is an end-to-end digital service for intracompany voice, data and video networking. It features on-demand circuit creation and user-selectable data rates from 2,400 to 512K bit/sec. The service requires Dama-net customer premises equipment.

Priores for the voice services consist of usage fee, monthly access charges, a minimum monthly usage fee of \$500/line and a recurring monthly \$50 automatic trunk routing charge.

The digital and integrated voice/data service includes a monthly charge of \$75/port, a nonrecurring fee of \$35 and line charges that vary by line speed, type of service and call route.

For further information, Dama Telecommunications is located at 100 Johnson Road, Parsippany, N.J. 07054.

Wang to buy Ungermann-Bass net products

SANTA CLARA, Calif. — Wang Laboratories, Inc. has signed a contract to purchase local-area network products from Ungermann-Bass, Inc., based here.

Under the terms of the contract, Wang will integrate Ungermann-Bass' Net/One broadband local-area network products into Wangnet and Wangnet Fasilan local-area networks. The Ungermann-Bass products will be used on the Shared Interconnect Modem Service (Sims) band within the Wangnet peripheral frequency band.

Wangnet is divided into multiple channels that are dedicated to certain applications. It will enable synchronous terminals, personal computers and printers to access a Wang network.

Sims will use two types of Ungermann-Bass network interface units (NIU) and its network management software. The units provide physical interfaces and the intelligence needed to attach 85-232 devices to Wang networks. NIU Model 180 supplies two ports, and NIU Model 180 has eight. The software maintains and downloads configuration software for all NIUs on the network.

With Sims, a user can attach up to 2,000 devices at a cost of \$500/port on a Wang network, Ungermann-Bass reported.

Wang will purchase \$2 million worth of equipment in the first year of the multiyear contract.

Ungermann-Bass is located at 2560 Mission College Blvd., Santa Clara, Calif. 95050.



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COMMUNICATIONS

Pacific Bell readies service enabling channel allocation

SAN FRANCISCO — Pacific Bell has announced plans to allow customers with private communications networks to manage or vary transport capacity from their own premises.

The service, Customer Controlled Network Management (CCNM), would enable users to allocate fixed bandwidth transmissions over Pacific Bell's T1 lines and cross-connect selected bandwidths to accommodate voice, data and video needs.

With a personal computer or dumb terminal, a user would be able to allocate the lines, 3000 series voice lines,

3000 series data lines or other transport lines. Each line could be configured for transmission speeds of up to 144 kbit/sec.

CCNM reportedly would provide alternate routing capability, Internet circuit and channel alarms, better transport security and better record keeping.

The service, subject to regulatory approval, would be available at the end of the year.

For further information, Pacific Bell is located at Room 608, 140 New Montgomery St., San Francisco, Calif. 94106.

Bridge enhances file server software running on Ethernet

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. has enhanced its file server software, which runs on Ethernet local-area networks.

The enhancements include the following:

- A global retry capability that searches for a free device whenever it may be on the network. If a medium is busy, the software will search for a free medium.

- Gateway support for data switches from Gandalf Data, Inc. and Micron Systems, Inc., which use long breaks as indications of terminal disconnections.

- Support of Hewlett-Packard Co.'s Emulex/ACKnowledgment flow control method.

- A network security feature.

Enhanced network management capabilities that can be used to list what software is running on a server.

- Support for terminals with 9-bit characters.

The software runs on Bridge's CB/1, which supports eight to 32 devices, and CS/160, which works with four to 14 devices. It is available for a yearly fee of \$150.

Bridge Communications is located at 1245 Shorebird Way, Mountain View, Calif. 94043.

VOICE/DATA COMMUNICATIONS

• Digilog, Inc.'s Network Control Division has announced that its Network Access Switch (NAS), an electronic matrix switch, has been redesigned to handle more ports at greater speeds.

The enhanced switch supports V.36 interfaces for data communications up to 54K bit/sec. as well as the previously supported RS-232C and four-wire analog circuit interfaces.

Capacity of the switch has been doubled from 60 to 120 ports. Up to six units can reportedly be configured in a daisy chain to provide a system with 1,440 analog or digital ports capable of supporting T30 lines. Any device attached to the system can be identified by a user-assigned eight-char. name.

The NAS system costs \$25,800, plus \$300 to \$400 per line, the vendor said.

Digilog, 1279 Walsh Road, Montgomeryville, Pa. 17046.

AUXILIARY EQUIPMENT

• Interpervisor, Inc. has released two models of its Interpreter Communications Control Unit that are said to allow dissimilar brands of office automation equipment to communicate with each other.

The units are said to enable IBM Personal Computers running Micropro International Corp.'s Multimate and Wordstar programs, CPT Corp. office computers, NRI, Inc. word processors, Xerox Corp.'s Model 860, Wang Laboratories' Inc. office machines and IBM 5530 word processors to exchange documents.

The CCU-4 is a four-port interpreter that enables up to four dissimilar asynchronous or bi-directional systems to exchange documents.

The CCU-W is a six-port interpreter with a 1024-byte Winchester disk that features automatic queuing, password protection and menu access control. Automatic queuing is said to allow up to five operators with dissimilar systems to send documents to a system as the receiver is ready to accept them. It is reportedly useful to users of port concentrators, data switches or multiplexers.

The CCU-4 costs \$13,490, and the CCU-W costs \$18,990.

Interpervisor, 11465 W. 48th Ave., Wheat Ridge, Colo. 80032.



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COMMUNICATIONS

BYPASS from page 65

of Seashan and Jackson, Inc., a communications consultancy in Washington, D.C.

AT&T contracted with Teleport Communications to provide the links between its point of presence and Merrill Lynch's headquarters. The service will be for voice-grade private lines, Dataphone Digital Services and high-speed digital Account services operating at 1.54M bit/sec.

Migrating most of its private-line services to Teleport Communications but retaining New York Telephone for other services provides "flexibility in terms of provisioning circuits and diversity so that if we get a cable cut, we might only lose half of the service instead of all of them," said Mike Loring, group manager of communications for Merrill Lynch.

Cost is not always the sole motive for bypass. The economic justification for this bypass system is obscured by the fact that Teleport is a Merrill Lynch subsidiary. "The cost of service the way Merrill Lynch is buying it [from AT&T] is the same whether the access is provided by New York Telephone or Teleport Communications," Thomas said. "Merrill Lynch is buying end-to-end service from us. If we were getting a lower price from Teleport Communications, the savings would not necessarily be passed through to Merrill Lynch."

Merrill Lynch does realize some profits (hence savings) from its ownership interest in Teleport Communications. But perhaps a more important benefit of this arrangement is that AT&T's use of Teleport Communications sets a precedent that the

Merrill Lynch subsidiary can use in marketing its services to other users.

For the former Bell operating companies, the precedent set by AT&T is ominous. Because of high access rates — artificially high because of cross-subsidization during the Bell System years and higher than its competitors because of the level of local access AT&T enjoys — AT&T has the single largest incentive to bypass local telephone companies.

With less than 15% of all businesses generating more than 80% of all long-distance traffic, the threat of AT&T bypassing the former Bell operating companies to reach its larger customers is obvious. Equally obvious is the fact that local companies like New York Telephone cannot afford to lose many large customers like Merrill Lynch without making up the difference in other rates.

TANDEM from page 65

products that conform to various levels of the ISO's seven-layer model. Tandem products that conform to the lower three layers of this model are already available. Products that conform to Levels 4 and 5 are reportedly under development.

Tandem is located at 19333 Valco Pkwy., Cupertino, Calif. 95014.

SWITCHES from page 65

ing on configuration.

While similar in design to the INX4400, the INX4300 is a matrix switch that is said to be designed for synchronous, on-line, real-time environments. The switch supports 1,000 synchronous cross-connections at speeds from 9.6K bit/sec. to 19.2K bit/sec. through RS-232C/V.24 interfaces. Half in many cross-connections are supported at 64K bit/sec. with V.26 interfaces.

Scheduled for shipment in July, the INX4300 costs between \$300/part and \$400/part.

Both switches can reportedly be linked using an interswitch networking capability and T1 digital carrier facilities operating at 1.54M bit/sec. To perform tandem switching and alternate routing over each network, the address mapping tables in each switch must be changed with a \$5,000 software upgrade. T1 switch interfaces cost \$7,000/switch to \$12,000/switch, depending on the number of modules and cabinets.

A fiber-optic interface was also announced that is said to enable INX slave switch modules to be linked in a ring at distances up to 2 km. A transmitter/receiver fiber-optic interface pair costs \$5,000.

Infotronics, Cherry Hill Industrial Center, Cherry Hill, N.J., 08002.

Forte introduces



ISDN

from page 65

spread is on hold heads and rob it in the dirt, nothing happens. By the time the telephone returns to find the can run, the characters have moved on to the next turn.

With the old West has gone high technology. One state that has received a great deal of attention recently is the Integrated Services Digital Network (ISDN). First conceived in the early 1970s by AT&T, ISDN would be fully realized when digital facilities replace analog equipment. Because the system would be completely digital, it would eliminate noise, provide high-speed, high-quality lines and cost less than current systems.

ISDN would enable a user to send data, video or voice messages through one plug. Data services the-

Integrated Services Digital Network (ISDN) would benefit all users if it worked as the vendors claimed, but the chances of forging a standard ISDN in the U.S. are slim.

retically would allow a user to access any type of equipment. For example, a Digital Equipment Corp. minicomputer user could access an IBM 3090 mainframe.

Forging an ISDN model

Constructing such a system is a formidable task. For the past few years, the Consultative Committee on International Telephony and Telegraphy has been attempting to forge a standard ISDN model. Thus far, the committee has constructed a seven-layer model that looks like

the IBM's Systems Network Architecture or the International Standards Organization's Open Systems Interconnection model. The first three layers have been finalized, and a number of telephone companies have announced plans for ISDN field tests in 1986 and 1987.

With this progress have come the usual vendor claims that ISDN is a sure-all offering low-cost, easy in-

stallation and true integration. In reality, ISDN will probably offer users access to a complex network with capabilities that may or may not be needed and create another series of system configuration alternatives.

ISDN will connect AT&T, common carriers and the devoted Bell operating companies so much as or possibly more than users. "The [devoted Bell operating companies] have to provide ISDN or else they will be bypassed," said Al Rawlin, product manager at Mital Corp. Rawlin made his comment at "ISDN Networks for the Future," a conference held earlier this month in Atlantic City and sponsored by Boston-based Information Outposts, Inc.

Common aims

ISDN would benefit all users if it worked as the vendors claimed, but the chances of forging a standard ISDN in the U.S. are slim for a number of reasons.

Devotees have limited AT&T's ability to provide the service completely. The dividing line between a common carrier's and a devoted Bell operating company's responsibilities are unclear. To ensure that all parties are creating compatible systems, detailed specifications have to be placed in the public domain. Since the devoted Bell operating companies and common carriers are competing, there is some doubt that they will be willing to share such information.

Even if they did share that information, there is some question that the companies will construct compatible models. Models built for the 1986 and 1987 field tests do not appear to be compatible.

Competition and compatibility questions do not stop with the telephone companies. Vendors will have to construct ISDN-compatible terminals, gateways and private branch exchanges. It is likely that vendors will sacrifice strict adherence to ISDN standards for capabilities that may provide a marketing edge.

ISDN is always looking for a marketing edge. It has not yet entered ISDN and may never endorse it. Given the huge investment in existing ISDN products, users will want to keep their equipment rather than trade it in for ISDN equipment.

Another possible roadblock is the Federal Communications Commission. The FCC has stated that it is in favor of ISDN and would not want to hinder its acceptance. Yet the FCC will be forced to determine ISDN technology.

The network structure will prove key to ISDN. For ISDN to be adopted, it must be better or cheaper than existing systems. ISDN will have to offer either cheaper rates or higher bandwidths to gain user interest. All carriers will be attempting to pull the FCC in a direction that favors their service. The FCC will probably waver back and forth.

The carriers' constant bugging at the standard will probably rip it apart and leave the users to piece together their own ISDN systems.

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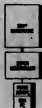
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SYSTEMS & PERIPHERALS

CDC boosts supermini capacity

MINNEAPOLIS — Control Data Corp. has announced enhancements that double the memory capacity of its Cyber 180/810 and 180/820 superminicomputers. The company also reduced prices on currently available Cyber memory and disclosed options for expanding the number of data channels on the 810 and 820 models. Maximum memory on the 810 and 820 models has been doubled to 32M bytes. Memory upgrades will be available in June for \$4,000 per megabyte, with a monthly maintenance cost of \$30 per megabyte. The memory employs 256K-bit CMOS chip technology, the vendor said.

The memory expansion will apply to the Cyber 170/816 and 170/825 mainframes and will quadruple maximum memory from 8M bytes to 32M bytes. Memory expansions for the 170/816 and 170/825 will be available Aug. 1.

A cost reduction of 35% — to \$5,000 per megabyte — applies to the currently available 64K-bit chip technology memory, the vendor said. The 64K-bit machines have maximum capacities of 2M, 4M, 8M, 12M and 16M bytes, while capacities for the 256K-bit memories are 16M and 32M bytes.

The company also announced options for expanding the number of integrated controller interface channels available with the 170/810 and 170/820 from four to six. This option, available in June, provides increased support for the CDC Model 834 9-in. disks and Model 839 streaming tape drive.

A total of six disk and tape adapters can be installed within 170/810 and 170/820 cabinets, compared with the previous maximum of four adapters. A \$6,000 one-time reconfiguration charge will be levied on customers with existing, fully expanded systems. See CWD page 71.

'Amateurs' build 16-node 256-Mflop parallel CPU

By Susan Berman
OF Staff

NEW YORK — Two Columbia University theoretical physicists have built a 16-node parallel processor, which they said cost them less than \$100,000.

The professors — who call themselves amateur computer scientists — used components donated by Intel Corp. and funding from the U.S. Department of Energy's High Energy Physics agency to construct the 16-processor machine, according to Prof. Norman Christ, one of the developers.

Each processor in the parallel processing machine is capable of reaching peak speeds of 16 million floating-point operations per second (Mflops) and average speeds of 8 Mflops, he said. All together, the machine can run at a peak speed of 256

Mflops, according to Christ.

Christ and Prof. Anthony Tversov, the other primary developer, use the system to simulate the physics of strongly interacting particles, particularly quarks — the smallest constituent of the neutrinos and protons that make up the nucleus of an atom — Christ said. "We were limited before to what we could do on a [Digital Equipment Corp.] VAX, and most calculations are much too hard to do on a VAX," Christ said.

The work the two professors are involved in is a hot subject in research circles, and they wanted processing power in the 1- to 10-Gflop range to be able to make significant progress in the field, Christ said. The chances of obtaining a supercomputer were slim to nonexistent, he said, so

See PARALLEL page 75

Calcomp workstation out

ANAHEIM, Calif. — California Computer Products, Inc. has released a workstation terminal for use with Digital Equipment Corp.'s Microvax II supermicrocomputer. The 4600MV color raster graphics terminal features 1,280 by 1,024-pixel resolution, a 60Hz refresh rate, a 125-msec pixel speed, up to 256 simultaneous colors and Calcomp's VistaGRAF software package for \$31,500.

The unit includes 640K bytes of graphics structure storage, a keyboard and data tablet. The workstation was designed for interactive applications such as mapping, engineering, simulation and training, tactical command and control and computer-aided design and manufacturing, the vendor said.

The VistaGRAF software is tightly termi-

nal resident, the vendor said. All graphics tasks — such as display file handling and image transformation — are performed by the terminal. The VistaGRAF Host Package resides on the Microvax II and consists of application-callable interface routines, error-checking routines and host/controller communications utilities.

Software functions include hierarchical structure support and structure-editing capabilities. Local scale, translate and rotate of graphics images also are supported in addition to pixel plane partitioning and pick capability, the vendor said.

Two independent 6600MV workstation terminals — each with a dual monitor — can be driven from one Microvax II processor in either serial or parallel mode, the

See CALCOMP page 75

■ Gerber Technology unveiled two stand-alone Unix-based CAD/CAM workstations/74

■ A laser printer for IBM System/34, 36 and 38 users was announced by GSD Systems/74

■ Computer Consoles added a floating-point accelerator to its Power 6/32 superminicomputer/74

■ Wang introduced an asynchronous workstation, the 2110-VS/76

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Processors/74
Data Storage/74
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Marketing blunders sideline early mainframe vendors

FOURTH IN A NINE-PART SERIES

By John Donahue
OF Staff

Any talk of mainframes usually includes IBM, the IBM-compatible manufacturers and the so-called Bunch companies. But there were six other companies that, in the early days of computing, made serious attempts to compete in the developing mainframe marketplace.

At key junctures in their histories, all six companies — General Electric Co., the Radio Corp. of America (now RCA Corp.), Singer Co., Bendix Corp., Philco Corp. and Xerox Corp. — decided they could sustain no further losses and quit the business.

It was seldom technical deficiencies in products that did in the companies' computer ventures, for in the early days of computing a machine's speed was often its main selling point.

What put most of the companies in trouble was a lack of expertise in marketing computers.

Most of the six companies built on their knowledge of electronics gained through military contracts to develop commercial data processing systems. Each of the companies had successful noncomputer products, which tended to inhibit them from committing the capital necessary to make a success of computer manufacturing, histories of the firms show.



GE, founded in 1892, was already a successful electronics firm that, in 1963, was eight times larger than IBM. GE completed work on the military computer Orac in 1963, and this military work was the basis of the company's entry

into the commercial field. In 1966, GE won two computer contracts: one with the Bank of America to develop the Eran automated reading and sorting system and another with National Cash Register Corp. (now NCR Corp.) to produce the NCR 304 transactional computer.

A former GE employee, William Stanger, who worked in the company's Process Control Division, said GE's timing was probably its fatal flaw.

"GE did very few things right — getting in and out [of the computer business] when they did. If they had really been prepared, they would have become a distinct presence in the DP industry. IBM thought so too," Stanger said, adding that GE had a strong engineering and manufacturing background but lacked an effective marketing team. "GE could never face up to the real problem of the marketing side of the business — responding to customer needs." Stanger said. See BUSINESS page 72.

SYSTEMS & PERIPHERALS



Toby O'Brien, engineer on GE's Emma project, empties the sorter's reject pocket.

MARKET

From page 71

The GE 225, announced in 1963, was a competitor to the IBM 1620, announced in 1959. The 225 featured 20-bit addressing and a 20-msec machine cycle time. The succeeding GE 400 series was faster but ran up against the IBM 360 series, announced in 1964.

GE quickly felt the sting of IBM's 360. When their leases on GE 400 series ran out, a number of customers decided to switch to the 360 and return the GE machines. "GE never really came up with any decent competition to System 360," Stanger said. "It was a hell of a bloodbath."

The succeeding GE 600 series combined a military design from the company's Syracuse Electric Division, with commercial features devised by a team in Phoenix. "They had terrible hardware problems" with the series, Stanger said, noting the announcement was delayed by two years.

In 1970, GE sold its computer division to Honeywell, Inc. which cleaned up the 600 series, renamed it the 6000 and continued selling it for many years.

Because GE was so diversified, the company found it difficult to compete with more specialized firms like IBM, Hench said. "GE at that time had many diverse divisions with a heavy investment in many areas — including jet engines, nuclear power plants and the computer field. The company found it difficult to find resources to invest in all those businesses. It was different from IBM, which was mainly in the computer business."

GE exploited its research partnerships with MIT and Dartmouth College to form Geisec, which evolved from time-sharing to remote computing services to on-line finance and banking systems today.



RCA delivered its first computer system, the Simatic, to the U.S. Army in 1965. Deciding early on a strategy to wean customers from IBM, RCA announced the Spectra 70 series to compete with IBM's 360 series in 1964. The Spectra series included eight models — the 15, 25, 35, 45, 46, 55, 60 and 61 — and could run the extensive software applications available for the IBM 360.

Curt Koster, who worked in technical support for RCA's international marketing division in the company's computer days, recalled that the Spectra series' hardware and software were technically impressive. In a hardware innovation, the Spectras featured a multilayered back panel that offered greater reliability than the discretely wired back panel connections common at the time. Koster also claimed GE made a significant software innovation on its early systems by introducing virtual memory to the Spectra line with the VM/OS operating system.

RCA's weakness, in Koster's view, was not in its marketing — which was successful in its effort to cut into IBM's market share — but a lack of financial management in the computer division. When it came time to invest heavily in the computer division and endure years without profit, the company's board of directors balked, Koster said. RCA sold its customer base to the Univac division of Sperry Rand Corp. in 1971.



In 1960, seeking to build on its success in the copier business, Xerox acquired Scientific Data Systems (SDS), which the previous year had broken \$100 million in revenue from the sale of its computers. Xerox paid \$918 million for SDS, four times the amount Honeywell paid for GE's computer division a year later. For Xerox, the troubles began immediately.

Author Katherine Flaminio in the book *The Computer Establishment*, described the early problems of the SDS acquisition. Xerox wanted to reach commercial customers, and SDS was selling computers to scientists. Much of SDS' business had come from the space program. After the National Aeronautics and Space Administration put a man on the moon in 1969, its investment in computers waned and away went a chunk of SDS' market.

The recession of 1970 spelled the beginning of the end for the Xerox Data Systems division. Xerox needed to win over IBM customers but had no means to do so. Its products were becoming obsolete and newcomers like Digital Equipment Corp. were moving into its traditional market. When Xerox announced in 1975 it was getting out of mainframes, its losses to that date were estimated at \$264 million, Flaminio stated. Honeywell took over the maintenance and support of Xerox large-scale processor customers. Today, Xerox remains a player in the office automation field.

PHILCO

Philco, which specialized in military and consumer products such as television sets, entered the computer field in 1968 with the Transac 3000, called the first large-scale transistorized computer for the commercial market. Harry Larson, who worked as a technical director for the Aeronautics Division of Philco-Ford, described the 2000 as a "phenomenal machine for its time. It was fast, extremely fast." Speed sold computers in the early days, especially to scientists. But Philco "never mounted anything like the marketing thrust the big companies did. They didn't have the first things you need to be in the business," such as field service engineers, said Larson, who now works in research and development for Hughes Aircraft Co.

The Ford Motor Co., which acquired Philco in 1961, sold the Philco brand name to GTE Syvania, Inc. in 1974.

SINGER
FRIDEN DIVISION

Sewing machines had seen the forerunners of Singer, which diversified into the computer business with its acquisition in 1963 of Friden, Inc., originator of the Friden rotary calculator. With its announcement of the Singer System 10 in 1970, the company targeted the point-of-sale terminal and small-scale general-purpose data processing markets.

According to Stanger, who worked as an applications engineer at Singer Business Machines in the 1970s, the Singer System 10 used resistor-transistor-logic, instead of the transistor-transistor-logic (TTL) in most of its contemporary machines. "The rest of the world changed over to TTL in 1965 (and 1967)," Stanger said. By the mid-1970s, outdated technology began to catch up with Singer. "Parts were too expensive, too big and generated too much heat. It was ancient [technology]," Stanger said.

Despite the outdated technology, Singer did have contracts to sell terminals to Sears, Roebuck and Co. and J. C. Penney Co. "What killed it was that NCR got serious about the business," Stanger said. Singer announced in 1976, soon after Joseph B. Flavin became chairman and chief operating officer, that its Business Machine division was shutting down. Flavin said at the time, "This is a practical economic decision in view of the substantial losses suffered by the division and the limited availability and high cost of capital."

Bendix Computer

In 1962, Bendix Aviation Corp. acquired Northrop Corp.'s computer division to enter the computer business. Bendix produced the G15 in 1964 and the G20 in 1968. Harold Huskey, now a professor of information and computer science at the University of California at Santa Cruz, was then a consultant to the computer division of Bendix Aviation. Huskey said the Bendix processors were efficient and performed well and offered competition for IBM. But support for the products was weak, especially software support, Huskey said.

Huskey said management at Bendix, which made significant profits in automotive parts such as power steering, "decided it took too much money to stay in the computer business." Bendix sold out to Control Data Corp. in 1963.

This is the fourth in a series covering pioneers in the microcomputers marketplace. Earlier articles appeared in the issues of Feb. 18 (Sperry), March 18 (NCR) and April 8 (IBM).

SYSTEMS & PERIPHERALS



ART COURTESY OF MICROBELL & ASSOC.

Extinct large-scale computer makers

General Electric Co.



GE 200 series (1961)

215	225	235	245
(1963)	(1961)	(1963)	(1963)

GE 400 series (1963)

415	425	435	445
(1963)	(1963)	(1963)	(1963)

GE 600 series (1964)

620	630	645
(1964)	(1964)	(1966)



Philco Corp.

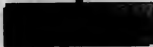
Transac 2000
(1968)

RCA Corp.



Spectra 70 series (1964)

15	25	35	45	55	65	75
(1964)	(1964)	(1966)	(1967)	(1964)	(1969)	(1969)



Bendix Aviation Corp.

615
(1964)
620
(1966)

Xerox Corp.



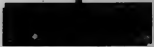
Sigma 5 (1967)

Sigma 6 (1970)

Sigma 7 (1966)

Sigma 8 (1971)

Sigma 9 (1970)



Singer Co.

Singer System 10
(1970)

SYSTEMS & PERIPHERALS

Gerber offers Unix-based CAD/CAM workstations

SOUTH WINDSOR, Conn. — Gerber Systems Technology, Inc. has unwrapped two stand-alone computer-aided design and manufacturing workstations that run under AT&T's Unix operating system.

Both systems were designed for the mechanical design and manufacturing market, the vendor said. The software creates tool paths for cutting tools in a manufacturing environment. Both 32-bit workstations offer virtual memory, floating-point accelerators and double-precision arithmetic.

The Model SH5000 costs \$80,000

and up and features a Hewlett-Packard Co. 9000-500 supermicrocomputer, an HP 5658-byte disk drive, an Interdata Corp. CRT, a Summagraphics Corp. digitizer pad and an Amkey Corp. keyboard and Gerber's drafting, design and numerical control software. The Model SH5000, which starts at \$70,000, is similar to the Model SH5000 but features a Mascomp 500 CPU and an 85M-byte disk drive, the vendor said.

More information can be obtained from Gerber Systems Technology, 40 Gerber Road E., South Windsor, Conn. 06074.

GSD Systems unveils printer aimed at IBM mid-range CPUs

CHICAGO — GSD Systems, Inc. has unveiled the Laser/5224, an 8 page/min laser printer for IBM System/34, 36 and 38 machines. The printer — priced at \$8,495 — consists of a Hewlett-Packard Co. laserjet printer and an interface box that attaches the printer to the IBM host. The Laser/5224 includes paper trays for both letter- and legal-size paper and a font cartridge necessary for

compressed print.

The unit offers printing at 80-char. at 10 char./in. vertical or 100-char. at 18.5 char./in. horizontal, the vendor said. Print size selection is said to be handled through IBM operator control or command language instructions.

More information can be obtained from GSD Systems, Suite 505, 600 S. Dearborn, Chicago, Ill. 60605.

PROCESSORS

Computer Consoles, Inc.'s Commercial Products Group has announced the addition of a Floating Point/Matrix Accelerator to its Power 6/32 line of CPUs.

The accelerator requires configurations with a minimum of one magnetic tape drive, one disk drive and the Power 6 operating system, which is based on the University of California at Berkeley's Version 4.3 of Unix and AT&T's Unix System V.

The Floating Point/Matrix Accelerator is said to speed execution of math functions, such as sine, cosine, arctangent, log, exponent and square root.

Execution rates during Whetstone tests of 7.5M instruction/sec. for single precision were achieved when the

option was added to the Power 6/32 supermicrocomputer, the vendor said. The boards allow for field upgrades of existing systems.

The Floating Point/Matrix Accelerator option costs \$15,500 and will be available in the second quarter, the vendor said.

Computer Consoles, 87 Hightield St., Rochester, N.Y. 14609.

DATA STORAGE

IXI Sales & Service Co. has unwrapped two stand-alone duplication stations that duplicate 80 double-sided, double-density diskettes per hour.

The IXI stand-alone copiers are targeted at facilities duplicating less

Continued on page 75

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SYSTEMS & PERIPHERALS

PARALLEL from page 71

it seemed like a good strategy to build what they needed.

The system is like a commercial array processor, and it has 23-bit bus width, Christ said. "That is less precise than business computers have, but we don't need precision for our purposes," Christ said. Most of the primitive operating system, designed by Christ and Terrano in C language, resides on a VAX 11/780 that is hooked up to the parallel processor, he said. It loads executable modules and transfers data from the VAX to the parallel processor, he said.

Most of the programs written by the seven physicians who use the machine are in Intel Corp. versions of Fortran, PL/I or assembler, and they are compiled on the VAX, Christ said.

The system is ideal for projects that require enormous calculations, he said. "You can't transfer existing applications without converting everything," he said. It is better to dedicate the machine to a particular kind of problem than to try to tackle different applications on it, he said. "You have to work at programming it."

The system Christ and Terrano built is made from off-the-shelf components, "put together in a reasonable way," Christ said. "We have a sensible design — it's not really complicated." The individual boards have a data storage capacity of 128K bytes each of 48 word memory, he said. There is a four-slot multibus for each board, with an extra megabyte of memory for each node, he added.

The design team bought four Fujitsu America, Inc. Eagle disk drives for which they are finishing the operating system now, Christ said. When they hook the disk drives to the system, they will have just under 3G bytes of disk storage, he said.

CALCOMP from page 71

vendor said. The unit is said to be compatible, via the Microvax II, with DEC's VMS operating system. It can be linked to an Ethernet local-area network using optional hardware and software from DEC.

The basic 4500MY includes a Motorola, Inc. 68000 front-end microprocessor and Advanced Micro Devices, Inc.'s AMD 2905 bit-slice graphics processor. 640K bytes of storage memory expandable to 2M bytes and a double-buffered pixel memory. Standard features include an alphanumeric keyboard, serial interface to the Microvax II, self-diagnostics and a 19-in. color monitor.

OEM quantity pricing for the graphics controller alone starts at \$11,106, the vendor said.

Calcomp is located at 2411 W. La Palma Ave., Anaheim, Calif. 92801.

CDC from page 75

ed 170/810 and 170/830 machines (consisting of 16 channels — 12 native channels and four integrated controller interface channels) so that they can have 10 native channels and six integrated controller interface channels. If the 170/810 and 170/830 are ordered with 10 native and six integrated controller interface channels, there is no extra charge.

CDC can be reached through Box 8, 8100 34th Ave. S., Minneapolis, Minn. 55440.

Continued from page 74

than 10,000 disquettes a month, the vendor said. A special version can control up to two slave units in addition to itself, allowing all three units to duplicate simultaneously to produce 180 double-sided, double-density disquettes an hour.

The standard software package enables the copiers to learn and remember commonly used formats, including those of Apple Computer, Inc., Commodore Business Machines, Inc., Hewlett-Packard Co. and IBM, the vendor said. Users may access programmable data by attaching a CRT to either stand-alone copier's RS-232 port to monitor and change quality control, format analysis and protection design data.

IXI stand-alone copier prices start at \$37,000.

IXI Sales & Service, P.O. Box 26344, Port Station, Minneapolis, Minn. 55426.

Computerized Business Systems has announced two tape units that allow 16-in. cartridge tape backup for IBM System/34 and 36 computers.

The pair consists of the STMG-6800-PC, an internal tape unit for the IBM Personal Computer AT, and the STMG-8901-AT, an external unit that

attaches to any Personal Computer, Personal Computer XT or Personal Computer AT. Both units use an IBM 5560 emulation card and are IBM-compatible, the vendor said.

Features include a 90M byte/sec. tape capacity and error correction log. Prices for the storage media are \$45 per 90M-byte tape cartridge or \$300 for five.

The STMG-8900-PC costs \$4,995, and the STMG-8901-AT costs \$6,995. Computerized Business Systems, Suite 800, Parkside Center, 8020 S.W. Fourth Ave., Portland, Ore. 97201.

TERMINALS

Code Systems Corp. has introduced two workstation models to its line of Tiger ATX emulator-instruction processing systems.

The Control Code Tiger DS/PC and Tiger DS/XT workstations incorporate Microsoft Corp.'s MS-DOS operating system for compatibility with IBM Personal Computer software, the vendor said. The workstations are supported by Tiger-Link software, which causes them to emulate Code's C-300 terminals and accept file transfers from a Tiger ATX 8, 16, 32 or 64 system. The workstations can also be used as stand-alone desk-

top computers, the vendor said.

The DS/PC uses the 4.7-MHz, 16-bit Intel Corp. 8088 microprocessor and provides 256K bytes of memory and two 200K-byte diskette drives. The DS/XT substitutes a 10M-byte Winchester hard disk drive for one of the two diskette drives.

The price of the DS/PC starts at \$2,990, and the DS/XT prices begin at \$5,910.

Code Systems, P.O. Box 3790, 3065 W. 190th St., Terrance, Calif. 90516.

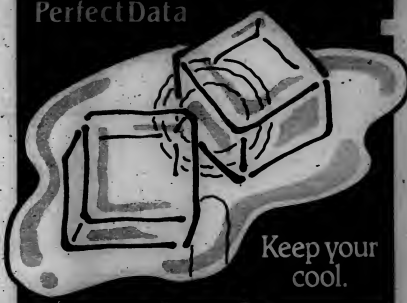
Human Designed Systems, Inc. has introduced a family of terminals that includes Ami standard, graphics and API models.

The HDS300 family includes the HDS300 Ami standard, Digital Equipment Corp.-compatible terminal, which has a 15-in. monitor, 80- or 132-col. display, 56 user-defined nonvolatile keys, four pages of memory, windows, viewports, multiple character sets and simultaneous multiple computer communications.

The HDS300G graphics terminal includes the above features plus a 720- by 360-pixel screen, Tektronix, Inc. 4610 and 4614 emulation, local printer support and a selectable printer buffer.

Continued on page 76

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SYSTEMS & PERIPHERALS

Continued from page 75

The HD8301 and HD8301G have all the capabilities of the Amx and graphics terminals, respectively, with the APL character set and keyboard and the capability of generating APL overstrike characters.

The HD8300 costs \$696. The HD8300S terminal costs \$1,396. The APL terminals are priced \$300 higher than the HD8300 models.

Human Designed Systems, 3440 Market St., Philadelphia, Pa. 19104.

■ **DMS International**, a division of L/T Technologies, Inc., has released its Ultima V Ascii terminal, sold to withstand harsh environments.

The Ultima V terminal has no vent holes and has a membrane keyboard to seal it against dirt. The terminal has a resolution of 720 by 300 pixels on a 19-in. screen, 27 programmable function keys and a 132-char. by 80-col. screen display. It emulates TeleVideo Systems, Inc.'s 960 and 920 terminals and provides host interfaces for RS-232C or RS-422 ports and an RS-232C printer port interface. Users may select from 50 to 19.2K bit/sec. transmission rates.

The cost of the unit is \$905. *DMS International, 8900 Lockwood Way, Carson City, Nev. 89701.*

■ **Wang Laboratories, Inc.** has announced the 2110-VS asynchronous

workstation and a series of asynchronous device controllers for general-purpose local and remote data processing environments.

The 2110-VS and the asynchronous device controllers support data base, applications and program development software, including Wang's Professional Application Creation Environment and Wang Office.

The 2110-VS features a 12-in. monitor and detachable keyboard. It costs \$595.

The asynchronous device controllers allow 2110-VS workstations, non-Wang asynchronous terminals and asynchronous peripheral devices to be connected to VS systems. The controller prices start at \$3,000 for an eight-port model. Controllers for the VS815, VS25, VS45, VS65, VS85, VS90 and VS100 will be available in June and controllers for the VS300, in the third quarter of this year.

Wang, One Industrial Ave., Lowell, Mass. 01851.

■ **Extel Corp.** has announced a terminal for message and data communications applications and a message-switching device for incorporating different code, speed and protocol ports into the same communications system.

The Comwriter Jr. is a dedicated communications terminal said to allow users to send messages over telephone lines and dedicated telex or private-wire networks. It can be used

to access telex, teletypewriter exchange and other message communications services as well as for electronic mail applications.

The unit includes a 12-in. CRT, a printer, a built-in modem and type-writer-style keyboard. Other features include 8K to 16K bytes of memory, text editing capability and subterminal keys that permit single-key sending of messages over common-carrier services, the vendor said.

Prices range from \$1,500 for an 8K-byte memory model with a thermoprinter to \$1,895 for a 16K-byte memory unit with a nine-needle dot matrix printer.

The Commanager multiprotocol message switch is said to handle up to 32 communications lines. It can operate at eight-level code (ASCII) or five-level code (Baudot) and at 50 to 9.6K bit/sec. transmission rates.

The Commanager is available for simplex, half-duplex, full-duplex and echoplex operation. It costs approximately \$15,000, the vendor said.

Extel, 4065 Commercial Ave., Northbrook, Ill. 60062.

■ **The Data Products Division** of Lear Siegler, Inc. has announced a general-purpose VDT that is compatible with Lear Siegler's ADM 3A, ADM 3 and ADM 11 terminals; Applied Digital Data Systems, Inc.'s Viewpoint and Viewpoint 35; Hamilton Corp. 1460, 1490 and 1590 terminals; and Digital Equipment Corp. VT63 terminals.

The ADM 11plus conversation-mode terminal features 10 function

keys for 16 programmable and 16 nonprogrammable functions and will handle transmissions up to 19.2K bit/sec. It has three edit keys and a break key that can be programmed to perform an additional seven functions.

The unit costs \$696. *Lear Siegler, Data Products Division, 501 E. Bell Road, Ann Arbor, Calif. 48106.*

■ **Quint Corp.** has announced three smart terminals equipped with keyboard, bidirectional printer ports and 14-in. monochrome green or amber screens.

All three terminals are equipped with RS-232 interface and optional RS-422 and current loop interfaces. The QVT-119 is a general-purpose editing terminal with 132-col. display, double-height, double-width lines; 42 host or user-programmable functions; and Applied Digital Data Systems, Inc.'s Viewpoint A3 emulation. It features block mode data transmission and costs \$696.

The QVT-301 emulates Digital Equipment Corp.'s VT100 terminal and is compatible with the DEC VT220 terminal. It reportedly offers 34 host or user-programmable functions and costs \$995.

The QVT-302 offers DEC VT220 emulation and 30 host or user-programmable functions, with features such as soft-flow, composite video, a supplemental character set and selectable foreign languages. The QVT-205 costs \$795.

Quint, 2350 Quint Drive, San Jose, Calif. 95131.

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COMPUTER INDUSTRY

French software exec says progress hampered

By Peter Bortolich
CN Staff

PARIS — Although France claims to be No. 2 and trying harder in the world software marketplace, French software industry executives said their progress is hampered by government policies and a shortage of trained software professionals.

In an interview with *Computerworld* during the recent Special Week '85 conference here, Philippe Dreyfus said that software-generated revenue in the French software industry exceeds that of the UK, West Germany and Japan and is second only to the U.S. Dreyfus is president of Syntec-Informatique, a software industry association representing 52 of the largest French software firms, and vice-chairman of Cap Gemini Societ, a leading software

and services company.

According to Dreyfus, French software and services companies generated approximately \$3 billion in revenue last year, a figure that does not include the software-related revenue of French hardware companies. While the member companies of Syntec-Informatique make up only a small fraction of the nearly 1,000 French software companies, they generated roughly two-thirds of that revenue total, Dreyfus said.

Dreyfus said software industry revenue has grown at about 21% a year since 1978. Approximately one-fifth of that revenue came from exports of software products. The industry employed 48,000 people in 1984, an increase of about 10% from 1983. Dreyfus said that French software com-

See B2008 page 85

Lotus predicts 30% growth through 1986

By Bob Bunker
CN Staff

BOSTON — Lotus Development Corp., which posted a revenue of \$187 million in its second year of sales, expects to see much more moderate growth through 1986, company officials said last week at Lotus' annual meeting here.

Predicting that that Lotus' growth has tended to parallel overall personal computer shipments, President Jim Mani predicted that annual growth will be in about the 20% range for 1986 and 1988. Chairman Mitchell Kapor, however, pointed out that as the firm enters new markets such as applications for the Apple Computer, Inc. Macintosh, "our own growth could be in excess of that."

In two years, Lotus has grown to become the largest independent software vendor of any kind, micro or mainframe," Mani remarked. "So far, so good."

Mani forecasted particularly quick growth in overseas sales, which accounted for roughly 10% of revenue in fiscal year 1984. As one step toward that growth, the firm announced last week that it will form a wholly owned subsidiary in Tokyo, to develop products for the Japanese market jointly with Kanri Kogaku Kenkyusho Ltd., known as K2, and market Lotus products in Japan next year.

Earlier this month, Lotus shipped its millionth software package, Kapor said.

According to Kapor, the Cambridge, Mass., firm will meet its scheduled May 37 shipment date for Jan, a multifunction application for the Macintosh.

Mani underlined the importance of Lotus' alliances with other firms, including the pending acquisitions of Dataquest, Inc. and Software Arts, Inc. He noted the joint micro-to-mainframe effort with Cullinet Software, Inc. and said that Lotus is discussing cooperative ventures with other mainframe software suppliers as well.

The annual meeting also highlighted Lo-

See L2008 page 85

■ A California electronics publishing firm recently announced a technology exchange agreement with China/78

■ Supercomputer maker Denixor reportedly is looking for somebody to bail out the perennial money-losing operation/80

■ Micro software vendor Ashton-Tate looks to the Far East for sources of revenue/86

Ztel Files Chapter 11 petition to procure additional financing

By Peter Bortolich
CN Staff

WILMINGTON, Mass. — Ztel Corp., a communications products vendor financed with more than \$445 million in venture capital, recently announced it had filed a reorganization petition under Chapter 11 of the U.S. Federal Bankruptcy Act to obtain additional financing from three of its four original backers.

The announcement coincided with the appointment of Murray E. Bolt to the position of president and chief executive officer, replacing Peter S. Anderson who left the company last December. Bolt was formerly vice-president and general manager of the Local-Area Network Products Business Unit of Motorola, Inc.'s Codex Corp. subsidiary. Prior to Codex, Bolt spent 18 years with IBM.

Ztel made the unusual move of seeking Chapter 11 protection to recapitalize because one investor, Adler & Co. of New York, was unable to participate in the additional financing, according to Kevin P. Moersch, Ztel vice-president of sales. Under the original bylaws, Moersch said, Ztel was precluded from accepting additional financing if it would deplete the equity of the four backers. The other three backers, NCR Corp., General Electric Venture Fund and Billman Co., were unwilling to provide the financing without diluting Adler's equity, Moersch said.

Moersch conceded there is "a risk anytime Chapter 11 is mentioned," but he said the reorganization "will give us the flexibility to manage the company the way we need to [manage it]."

See Z208 page 84

AT&T selects president

NEW YORK — AT&T recently announced that James E. Otson, corporate vice-chairman and head of AT&T Technologies, will assume the positions of corporate president and chief operating officer, effective June 1.

In a move seen by some observers as putting him in line to succeed Chairman Charles Brown, who retires next year, Otson was placed in charge of all of AT&T's principal lines of business in the U.S. and abroad. AT&T said Otson would retain the position of chairman of AT&T Technologies, a post he was named to in January 1984. Reporting to Otson will be Randall L. Tobias, chairman of AT&T Communications. Continuing to report to Otson

will be Robert R. Allen, chairman of AT&T Information Systems, Inc. H. Ross, president of Bell Laboratories; and Donald R. Procknow, vice-chairman of AT&T Technologies.

The presidential post had been vacant since April of last year when William C. Ellinghaus retired.

According to AT&T's Brown, the adoption of the chief operating officer concept will "drive research, applications development, investment decisions and service co-

requirements straight at customer requirements as defined by the marketplace."

He held the reorganization will improve the cohesiveness of AT&T operations.



Otson

BT buy stirs U.S. waters



INDUSTRY INSIGHT
Peter Bortolich
CN Staff Writer

British Telecommunications Plc. (BT), which recently announced it will acquire a majority stake in Canada's Bell Corp., is seeking out international revenue and shaking up UK equipment suppliers, according to a British telecommunications consultant.

Ray Northcutt, vice-president of UK-based PA Computers and Telecommunications, who was recently assigned to the firm's Princeton, N.J., office, said BT's shift from a semiautonomous monopoly to a commercial enterprise has been more effective than many in the UK be-

lieved possible.

The British government last year privatized the communications services supplier by selling off more than half of BT's stock on the public market. In preparation for that transition, Northcutt said, BT in the past three years "has sharpened up and commercialized its operations" partly by persuading many of its top managers to take early retirement.

The company has sought out "a new breed of management" in tune with changing technology and the needs of the marketplace, Northcutt said.

"Like any private sector company, [BT] is making moves to take charge of its own destiny," he said.

UK industry reacted ambivalent-

See BT page 84

COMPUTER INDUSTRY

Electronics firm to exchange technology with China

By Kathleen Martin
CIS West Coast Bureau

SANTA CLARA, Calif. — A small electronics publishing firm recently announced a joint technology exchange with the People's Republic of China.

The agreement permits the Chinese to buy the technology for Corporate Data Sciences, Inc.'s (CDS) Data

Center electronic publishing workstation and manufacture the product in China, according to CDS President Phillip D. Martin.

CDS is apparently the first U.S. electronics vendor to sell its product technology to the People's Republic of China, Martin said during a recent press conference. Other American manufacturers

such as Intel Corp. and Hewlett-Packard Co. have already built factories in mainland China but, unlike CDS, have retained exclusive rights to their technology. Under the agreement, CDS will receive \$60 million from the People's Republic of China through 1987 as an undisclosed amount for any future products the venture

may produce during the next 30 years, Martin said.

According to Martin, CDS can export \$306 million worth of systems and peripherals to China over the contract's duration.

Speaking through an interpreter, People's Republic of China representative Wang Pingfang said, "This agreement underscores the

fact that China is now open to the world. We hope this will open the door to bringing in more U.S. microcomputer technology, with China supplying the labor, the land and the financing." Pingfang is vice-governor of China's Guangdong province, where CDS' factory will be located.

Pingfang said the Chinese hope to learn factory management, automation and quality assurance techniques from the venture.

Talks were begun with Chinese officials approximately a year ago, Martin said, but the product had to be repeatedly demonstrated to Chinese officials and international export regulatory agencies, which slowed down the process.

Martin said the system would support more than 4,000 common Chinese phrases and more than 7,000 Chinese characters. CDS' objective is to break into the Chinese marketplace, Martin said. However, Martin declined to estimate the market potential or the possible revenue CDS might realize from the joint venture.

The Data Center will be marketed in China and exported internationally with an English character set. Limited production will begin by the end of the year, Martin said.

The Data Center includes an IBM Personal Computer XT with CDS' bit-mapped graphics display processor with 624- by 624-pixel resolution and an optional display for lower level applications. Also included are a Chinese text processor called Quix and CDS' Model 2300 laser printer.



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Uccel profits rise 150%

DALLAS — Uccel Corp. recently reported first-quarter profits of \$1.5 million or 9 cents per share, up 150% from the year-earlier period, as revenue of \$46.1 million.

Uccel also earned \$880,000, or 5 cents per share, on extraordinary credit resulting from use of prior years' net operating loss carryforwards for total profits of \$2.3 million. In the same quarter in 1984, the company earned \$160,000, or 1 cent per share, from extraordinary credit for a total of \$779,000. Revenue for the year-earlier period was \$39 million.

The vendor attributed the earnings to strong sales in its principal divisions selling applications and systems software for mainframes.

Announcing the NCC tour guide



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We'll also cover NCC in three special issues of Computerworld. The July 8th Preview issue. The July 15th Show issue. And the July 22nd Wrap-Up issue. Advertise in these issues and ensure your investment in NCC. And, just as importantly, you'll keep your name in front of more than 667,000 computer-involved professionals all during this eventful period.

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Issue	Issue Dates	Closing Date
NCC Daily!	July 15, 16, 17, 18	June 10 (all 4 issues)
NCC Preview	July 8	June 21
NCC Show	July 15	June 28
NCC Wrap-up	July 22	July 5

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COMPUTER INDUSTRY

Ashton-Tate, SI form Tokyo-based partnership

CULVER CITY, Calif. — Ashton-Tate recently announced the formation of Nippon Ashton-Tate, a Tokyo-based partnership with its exclusive Japanese distributor, Software International (SI). SI is a wholly owned subsidiary of Japan Systems Engineering Corp.

Nippon Ashton-Tate will produce, market and sell Japanese versions of Ashton-Tate software products as well as provide a base for Ashton-Tate expansion in the Far East, a spokesman for the company said. Nippon Ashton-Tate will have Japanese management and ownership, but Ashton-Tate will monitor the quality control of its products and OEM agreements in Japan.

Ashton-Tate's Dbase II software is currently the second largest selling microcomputer business software product in Japan, according to the company.

Dbase II expected

Nippon Ashton-Tate will continue to market Dbase II and is expected to introduce Dbase III in Japan in the next

several months.

"There are unique requirements for doing business in Japan," said Ronald S. Pomeroy, Ashton-Tate vice-president of marketing, sales and international operations.

"We will rely on the expertise of our Japanese partners to enable us to produce and market software products that satisfy the specialized

needs of the Japanese marketplace."

Ashton-Tate currently has a distribution agreement with Advanced Computing Resources Ltd. to distribute its products in Hong Kong and Singapore. International sales and exports accounted for 22% of Ashton-Tate revenue in the fiscal year ended Jan. 31.

Denelcor downturn continues

AUBORA, Colo. — Denelcor, Inc. continued its series of financial losses in the most recent quarter and is reportedly seeking a purchaser for the company.

The 17-year-old maker of high-speed scientific and defense-related computers announced a loss of \$1.8 million, or 23 cents per share, on revenue of \$1.5 million for the quarter ended March 31.

The company reportedly cut the loss by selling a real-time system to a third-party leasing company during the quarter. Denelcor posted a loss of \$2.3 million, or 20 cents per share, in the first quarter a year ago on revenue of \$265,000.

Annual losses frequent

Denelcor, which has posted annual losses every year since its founding, is currently negotiating with several larger corporations regarding equity participation. Three companies are reportedly interested in buying a stake in Denelcor, including Martin Marietta Corp.

"Clearly, there are buyers interested in their [Denelcor's] technology," said Gary Blaser, an analyst with the Minneapolis-based investment firm of Dain, Bosworth, Inc.

According to Blaser, "They've made some great advances in the scientific computer field. If there's value there, it's hard to believe that investors would let it die. But at this point, it's hard to say what form the continuance of the company might take."

Denelcor also recently announced the resignations of President and Chief Executive Officer James A. Hill and Chief Financial Officer James Miller.

The company's board of directors named Denelcor's founder and chairman, David R. Miller, as chief executive officer.

Miller had previously served as chief executive officer until Hill took over in February 1982.



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Henco plans layoffs, salary cuts

WALTHAM, Mass. — Henco Software, Inc., a mid-computer software firm based here, recently announced it will lay off 8% of its work force and require all remaining employees to take a 10% cut in salary.

Henry Cochran, Henco founder and chief executive officer, said the moves were precipitated by sluggish de-

mand for the vendor's info software running on the Honeywell, Inc. DPG 6.

The firm will lay off nine of its 160 employees. "None of our orders are taking a little longer to come in, and we're a little off our plans for this year," Cochran said. "But we don't see an overall softness in our market niches; we're just reducing

our expenses slightly to stay within the budget."

Henco, a privately held firm founded in 1976, had sales of approximately \$6 million last year. Cochran said the firm will concentrate on its line of software for Digital Equipment Corp. and Prime Computer, Inc. sales and will introduce a version of info later this year.

CAI reports profit, revenue increases

JERSEY, N.J. — Computer Associates International, Inc. (CAI) recently reported an increase of 40% in profits for the fiscal year ended March 31 and an increase of 52% in revenue over that of the previous year.

Profits for the year just ended were \$13 million, or \$1.51 per share, compared with \$6.3 million, or 69 cents per share, a year earlier. Revenue was \$128.9 million, compared with \$84.7 million a year earlier.

In the fourth quarter, the company posted profits of \$3.6 million, or 33 cents per share, up 34% from \$2.7 million, or 25 cents per share. Revenue for the quarter was \$37.1 million, up from \$24.3 million.

Anthony W. Wang, president of CAI, said the results were achieved despite the adverse effects of the strong U.S. dollar. "Revenue for the year was reduced by approximately \$8 million because of the differences between the average exchange rates during the year and the exchange rates that prevailed at the beginning of the fiscal year," he said.

Signetics streamlines divisions

SUNNYVALE, Calif. — Signetics Corp. recently announced a major reorganization, streamlining the firm's eight product divisions into five, organized into two groups.

Signetics is a manufacturer of integrated circuits. The firm cited the need for a better response to the developing marketplace, especially in the area of application-specific products.

Signetics' last major reorganization took place in 1971.

The divisions will be reorganized into product groups that are devoted to integrated circuit products and programmable products. The second group will reportedly include the newly formed application-specific products division.

"This is where the marketplace is going — split along the lines of industry standard parts on the one hand, and custom, construction and application-specific products on the other," according to Norman Neumann, Signetics acting president.

Signetics is a wholly owned subsidiary of the U.S. Philips Corp., and its beneficiaries are shareholders of N.V. Philips of the Netherlands.

Signetics was the sixth largest U.S. semiconductor manufacturer in 1984, with sales amounting to \$730 million.

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EXECUTIVE
CHANGES

Donald Heitt has been named president of General Automation, Inc.'s Computer Group.

Fred Kleis has been appointed president and chief executive officer of Plexus Computers, Inc.

Gene Ray has been named president and CEO of Electronic Memories and Magnetics Corp.

LSI Logic Corp. has announced the appointment of George Wells as president and chief operating officer.

Quadratron Systems has announced the appointment of John J. Thelma as president and CEO, succeeding Karl Klesig, who will be-

come chairman of the board.

Tsunoo Tanaka has been appointed president of Hitachi America, Ltd., a subsidiary of Hitachi, Ltd.

Applied Information Memories, Inc. has announced the appointment of Donald Brown as president and CEO, succeeding Jack Taranto, who is now chairman of the board.

Continental Telecom, Inc.

has appointed Michael Munster as president of Connel Information Systems, Inc. Munster replaces Howard Frank, who recently resigned to pursue other business interests.

Eric Williams has been named president of Participation Systems, Inc. Williams will be responsible for a new sales expansion phase of the company's growth.

Robert Mahoney, presi-

dent of Diebold, Inc. has been elected CEO of the company.

Multi Solutions, Inc. announced that Martin Edelstein was named president and chief operating officer of its new subsidiary, Multi Soft, Inc. Prior to joining Multi Solutions, Edelstein was vice-president of strategic systems development at the Hertz Corp.

Lifetree Software, Inc. has appointed some members of senior management to new positions: Peter Pinner has been promoted to president; Fred Langbehn has been appointed to the newly created post of vice-president of development; Margaret Williams assumes the new post of vice-president of resource development; and Jackie Kelly has been promoted to the new post of chief financial officer.

Attache Software, Inc. has announced the following appointments: Gary Blum has been elected to the newly created post of chairman of the board; and Henry Caplan has been appointed president.

Arete Systems Corp. has announced the following changes in its management team: Russ Vrolyk, president of the company since 1982, has moved to vice-president of an expanded marketing and sales organization and has been promoted to chairman of the board; and Doug Davis, vice-president of operations and engineering, will replace Vrolyk as president and CEO. In addition, Davis will be a member of the firm's board of directors.

Computer & Communications Technology Corp. has announced the following appointments: William H. Gibbs to president and chief operating officer and Robert L. McKay to executive vice-president and chief financial officer, both reporting to E. T. Bahre, chairman of the board and CEO.

Perkin-Elmer Corp. has announced the following changes in its senior management: William W. Cherkas as executive vice-president, finance and administration; Mercedes A. Cramer Jr. as senior vice-president and general manager of the Optical Group; and Charles E. Minahan as senior vice-president and general manager of the Semiconductor Equipment Group.

David Fernald has joined BPI Systems, Inc. as president and CEO. Prior to joining BPI, Fernald was senior vice-president of marketing and sales for Datapoint Corp. Randy Ferguson, formerly BPI's president, will continue to serve as chairman.



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CDC sells manufacturing operation

MINNEAPOLIS — Control Data Corp. recently announced the sale of its Magnetic Peripherals, Inc. (MPI) manufacturing facility in Bemidji, Minn., to Digigraphic Systems Corp. (DSC).

Under terms of the deal, CDC will acquire 177,178 shares of DSC common stock, will help DSC obtain additional state funding to support its business expansion and provide DSC with a long-term, low-interest capital lease on the facility. DSC is a Minnetonka, Minn.-based supplier of printed-circuit-

board-based hardware and software.

DSC plans to employ the approximately 300 MPI workers at the 60,000-sq-ft Bemidji facility, a spokesman said. The operation will be renamed the Northtech division of DSC's custom services group. The group has other manufacturing facilities in Tucson, Ariz.; Santa Ana, Calif.; Hastings, Minn.; and Eden Prairie, Minn.

Northtech will continue to manufacture assemblies for CDC as long as CDC continues to require them, the spokesman said.

ZTEL from page 77

Ztel produces a line of digital telephones but has run into problems with fully implementing its PTK product, a fourth-generation private branch exchange product designed to offer local-area network capabilities. In the past 18 months, the company experienced problems developing the software that would allow the PTK to live up to its design capabilities. In December and January, the

company dismissed 100 employees to cut costs.

Moersch stressed that the company was not forced into bankruptcy proceedings by creditors but voluntarily sought to reorganize because of the capitalization snag. Despite the taint that generally accompanies bankruptcy proceedings, Moersch said the company is optimistic that the appointment of Bolt and the additional financing will encourage potential customers.

BT from page 77

ly to the privatization of BT, Northcutt said. But, he added, the Mitel acquisition indicates "BT will also invade in an aggressive way a market that had been regarded as a supplier preserve." With BT providing the key outlet for UK suppliers, the possibility of Mitel products gaining market share is a concern to the likes of Plessey, Ptc. and the British General Electric Co., according to Northcutt. Although, as in the U.S., Mitel's dominance of the low-end market has become shaky in recent years, Northcutt observed that "nobody understands that market like [BT] does."

The competing UK suppliers have been afforded a buffer in the form of the Office of Telecommunications, which licenses BT and can require it to keep manufacturing at arm's length from its service operations. But, Northcutt said, "The fear is that if you liberalize a giant, it is likely to prove to be a difficult animal to restrain."

On the international front, Mitel offers BT a foothold to enter the global telecommunications battle, and cash-rich BT can provide substantial sums for research and development to financially ailing Mitel, Northcutt said.

BT intends to go "anywhere a profit can be made," and while not yet "explicitly in the computer business," it has established an organization, British Telecommunications Merlin, that has as one of its goals the capture of office automation markets, he added.

Northcutt believes that AT&T and IBM's Bolt Corp. subsidiary "should be looking over their shoulders." Instead of facing a relatively small company with limited product range, the two U.S. giants "are now facing competition that is on firmer ground," he said.



"My money back if not delighted?"



COMPUTER INDUSTRY

SICOB from page 77

panies have not benefited from a pervasive protectionist attitude on the part of the French government.

"We are not completely without protectionist policies," he said. "But we are best at keeping them unknown. Other countries are better at keeping quiet about their protectionism. Our policies are no worse than theirs, however. But there is more to the issue. U.S. [software]

companies, for example, have been unsuccessful here because you must speak French to sell in France. That is not protectionism."

Aiding growth

But the government has played a role in the growth of the French software industry, he said.

"Some people wonder why the French software industry has grown so fast," he said. "We are not world leaders in many areas. The soft-

ware industry is not subsidized, but the government has been involved since the 1960s in promoting technology. Early on, under [French President Charles DeGaulle], France recognized the importance of DE. That recognition spurred a rapid development of the computer industry in general and of the software industry in particular."

According to Dreyfus, French software manufacturers have targeted certain niche markets left open by

larger international competitors. These niches include software engineering methodologies and tools, videotext and the emerging fields of expert system design and artificial intelligence.

Profits not all easy

But the software picture is not entirely rosy. Dreyfus said the profit margin of most software companies is only 5% of after-tax revenue. Profits, he said, are slanted in large measure by the

French government's price-control policies, designed to stave off inflation.

"More than half the software business in France is under price controls. We cannot simply raise prices at will; the government determines the amount in which we can do that. For example, with inflation running at 6.5%, we are allowed to increase our prices only 5%. The rest of our profits must come from increased productivity, and that is very hard to achieve."

Also, according to Dreyfus, French software firms are limited by a shortage of technically proficient workers. "We are not satisfied either with the quantity or the quality of the people generated by the French computer education system," he said.

LOTUS from page 77

tax agreements with independent micro software developers, but Kaper said, "We don't see ourselves as venture capitalists with a pool of money that must be leveraged."

"We got up to a dozen inquiries a week about making investments or acquisitions," he added. "On the R&D side, we have plenty on the phone. It would be important to invest further at this point."

Future product development plans include greater emphasis on group — rather than personal — productivity, better communications links and use of artificial intelligence techniques, Kaper said. He cautioned, however, that the first Lotus products addressing these concerns will not ship until 1986.

He also downplayed expectations that future products are likely to reach the sales volume of Lotus' 1-2-3 package. "1-2-3 is an absolute phenomenon in software — never seen before, maybe never seen again," he said.

Other announcements

In other recent developments, Lotus appointed Gabriel Dunn, former director of product support with Digital Research, Inc., as vice-president of product development.

Also, the company announced that B. Jerrold Kapias, cofounder and former chief development officer of Teknowledge, Inc., will serve as principal technologist of Lotus' R&D team.

Lotus also said it will cooperate with Teknowledge on projects under development.



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MIDDLE SOUTH SERVICES is currently looking for several people including sales and marketing systems development. The current openings include: Director of Sales, Marketing, and Sales Support; and Sales Support.

ANALYST/PROGRAMMER

Analyst/Programmer with two years of IBM DB/DC planning and coding experience on large systems is needed to work on an IBM DB/DC system. Knowledge of DB/DC, TSO, and utilities required. PL-1, DB-1 and experience in developing application systems databases preferred.

Experienced Analyst/Programmer with two plus years of IBM DB/DC and experience in the analysis and design of large systems needed to develop applications and program generation support. Experience with problem analysis, COBOL, PL-1, and utilities required. PL-1, DB-1 and experience in developing application systems databases preferred.

PROJECT LEADER

Experienced individual with background in project management and a minimum of two years experience as a full time supervisor. The responsible candidate will also have had to have some background in coding, design and advancement of large IBM DB/DC systems primarily in the areas of planning, DB-1, and utilities. Must have a strong background in project management.

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Gearhart Industries, Inc., is nationally known for providing all level evaluation equipment and services. Headquarters in Fort Worth, Texas, we have a workforce of over 5,500 and operations in several countries. We attribute our rapid growth to the hard work and talent of our employees and structure our positions to reward quality performance. If you are interested in working for a company which promotes and develops career opportunities for professionals, consider the openings we now have available for degreed individuals in our Information Systems group:

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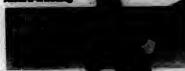
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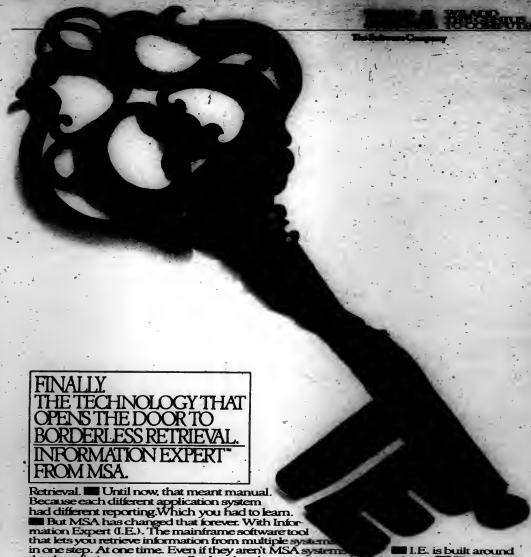
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